MARINE REVIEW

Entered at Cleveland Post Office as Second-class Mail Matter.

VOL. XXV. Published every Thursday at 418-19 Perry-Payne Bldg., by the Marine Review Pub. Co. CLEVELAND, O., FEB. 6, 1902. Subscription $3.00 a year. Foreign $4.50 a year. Single Copy 10 cents. No. 6

GROWTH OF IRON ORE TRADE.

THE TOTAL SHIPMENTS DURING 1901 WERE 20,589,237 TONS—TOTAL SHIPMENTS BY YEARS SINCE 1855 SHOWING THE REMARKABLE DEVELOPMENT OF THE ORE TRADE DURING RECENT YEARS.

At the beginning of last season it was predicted that 20,000,000 tons of ore would be brought down the lakes from the Lake Superior mines—the first time in the history of that great mineral region that such a figure would be reached. The twenty-million mark has been passed. The total lake and all rail shipments reaches the figure of 20,589,237 gross tons. This is exclusive of some 230,000 tons which were shipped from the Clergue mines in the Michipicoten district in Canada and which was partly consumed by furnaces in Canada and in the United States. The all rail shipments during 1901 were 431,715 tons as against 489,078 in 1900 and 350,446 in 1899. The amount moved by water during 1901 was 20,157,522, which added to the rail shipments of 431,715, makes a grand total of 20,589,237 gross tons against a total of 19,059,393 gross tons shipped in 1900.

It will be noted that the principal gain in shipments has been in the giant Mesabi, shipping 9,004,890 gross tons as against 7,809,535 tons in 1900, an increase of 1,195,355 tons. All the ranges, indeed, show an excess of shipments over 1900 with the exception of the Marquette range, which shows a decline of 202,842 tons. The mines of the United States Steel Corporation contributed 12,459,211 of the total of 20,589,237 tons last year—this in addition to one-half the 507,786 tons from the Pewabic, a half interest in this mine owned by the Carnegie Steel Co. Though the first shipment from the Mesabi range was in 1892, only ten years ago, it has already surpassed the Gogebic and Menominee ranges, having shipped a total of 40,404,967 tons against 37,621,428 for the Menominee and 34,154,790 from the Gogebic. Accompanying this issue of the Review is a tabulated statement showing the shipments of all mines since the discovery of ore in the Lake Superior region. It reaches the great total to date of 192,008,221 tons.

More ore was shipped from the Lake Superior mines during 1901 than was shipped in all the years combined from 1855 (when the Sault Ste. Marie canal was first opened) until 1882 inclusive. The total shipments during the first twenty-seven years were 20,140,695 gross tons. Indeed the great development in iron ore has been well within the past decade. The shipments since, and including 1895, have been 104,753,346 tons, which is in excess of the combined shipments of all the years preceding. The following table of ore shipments since the opening of the canal in 1855 is well worth studying as showing by what leaps and bounds the ore trade is growing:

Years.	Total shipments.	Years.	Total shipments.
1855	1,449	1879	1,375,691
1856	36,343	1880	1,908,745
1857	25,646	1881	2,307,005
1858	15,876	1882	2,965,412
1859	68,832	1883	2,352,840
1860	114,401	1884	2,518,693
1861	49,909	1885	2,466,642
1862	124,169	1886	3,565,144
1863	203,055	1887	4,762,107
1864	243,127	1888	5,063,877
1865	236,208	1889	7,292,643
1866	278,796	1890	9,003,725
1867	473,567	1891	7,071,053
1868	491,449	1892	9,072,241
1869	617,444	1893	6,065,716
1870	830,940	1894	7,748,312
1871	779,607	1895	10,429,037
1872	900,901	1896	9,934,828
1873	1,162,458	1897	12,464,574
1874	919,557	1898	14,024,673
1875	891,257	1899	18,251,804
1876	992,764	1900	19,059,393
1877	1,015,087	1901	20,589,237
1878	1,111,100		

The shipments during 1901 from the different ports, from the different ranges and from each of the mines were as follows:

SHIPMENTS BY PORTS AND ALL RAIL—GROSS TONS.

	1899.	1900.	1901.
Escanaba	3,720,218	3,436,734	4,022,668
Marquette	2,733,596	2,661,861	2,354,284
Ashland	2,703,477	2,633,687	2,886,252
Two Harbors	3,973,733	4,007,294	5,018,197
Gladstone	381,457	418,854	117,089
Superior	878,942	1,522,899	2,321,077
Duluth	3,509,965	3,888,986	3,437,955
All rail	350,446	489,078	431,715
	18,251,804	19,059,393	20,589,237

SHIPMENTS BY RANGES—GROSS TONS.

	1899.	1900.	1901.
Marquette range	3,757,010	3,457,522	3,254,680
Menominee range	3,301,052	3,261,221	3,605,449
Gogebic range	2,795,856	2,875,295	2,938,155
Vermillion range	1,771,502	1,655,820	1,786,063
Mesabi range	6,626,384	7,809,535	9,004,890
	18,251,804	19,059,393	20,589,237

MARQUETTE RANGE.

Mine.	Gross tons.	Mine.	Gross tons.
Beaufort	4,338	Lillie	98,788
Cambria	68,907	Moore	37,655
Champion	99,026	Negaunee	234,713
Chester	22,815	Princeton	67,051
Cleveland-Cliffs	874,465	Queen	400,845
East New York	31,696	Republic	104,604
Jackson	38,271	Richmond	54,181
Lake Angeline	481,574	Winthrop	109
Lake Superior	635,642		
Total			3,254,680

MENOMINEE RANGE.

Antoine	63,429	Hemlock	149,966
Aragon	477,212	Hiawatha	20,355
Armenia	18,780	Hilltop	2,503
Baltic	17,326	Loretto	54,985
Bristol	36,593	Lincoln	19,727
Chapin	929,701	Mansfield	74,113
Columbia	19,963	Millie	12,133
Commonwealth	77,799	Monongahela	2,397
Crystal Falls	230,614	Penn Iron Mfg. Co.	358,126
Cundy	160,519	Pewabic	507,786
Florence	15,395	Quinnesec	66,383
Foxdale	4,647	Riverton	119,860
Great Western	123,261	Tobin	18,957
Groveland	11,444	Verona	11,475
Total			3,605,449

GOGEBIC RANGE.

Anvil	1,101	Mikado	91,846
Ashland	286,399	Montreal	72,945
Atlantic	190,135	Newport	190,448
Aurora	223,747	Norrie	660,965
Brotherton	103,109	Pabst	198,686
Cary	179,374	Palms	7,603
Colby	23,475	Pike	6,346
Harmony	10,358	Puritan	21,788
Hennepin	21,475	Sunday Lake	89,997
Iron Belt	43,883	Tilden	446,670
Jack Pot	19,988	West Colby	12,836
Meteor	34,140	Windsor	841
Total			2,938,155

VERMILLION RANGE.

Chandler	627,379	Savoy	212,008
Minnesota	208,284	Zenith	60,082
Pioneer	678,310		
Total			1,786,063

MESABI RANGE.

Adams	829,118	Lake Superior	594,761
Auburn	427,510	Mahoning	765,872
Biwabik	410,074	Malta	126,299
Chisholm	34,573	Mountain Iron	1,058,160
Clark	199,566	Oliver	5,420
Columbia	15,627	Penobscot	221,080
Commodore	35,546	Pillsbury	120,723
Corsica	26,838	Roberts	42,756
Duluth	150,024	Sauntry	328,739
Elba	224,630	Sellers	34,918
Fayal	1,656,973	Sharon	56,810
Franklin	39,299	Sparta	156,426
Genoa	332,022	Spruce	279,515
Hale	30,929	Stevenson	666,273
Kanawha	41,300	Union	93,109
Total			9,004,890
Total all ranges			20,589,237

The Review is authorized to state that the Great Lakes & St. Lawrence Transportation Co., of which Mr. A. B. Wolvin is the moving spirit, has been organized with a capital stock of $500,000. As the name implies the purpose of the company is the operation of a line of steamers from the great lakes, via the St. Lawrence, with the port of Quebec as the objective point at which port alliances with several prominent transatlantic steamship lines have already been made, thus insuring a through freight service via the St. Lawrence and the port of Quebec to the principal English and continental ports. The officials of the company are now negotiating with the American Ship Building Co. regarding the building of vessels for this service.

SHIP BUILDING AT PHILADELPHIA.

Philadelphia, Feb. 5, 1902.—The William Cramp & Sons Ship & Engine Building Co. will afford the German crown prince an opportunity to inspect its plant during his brief sojourn in this city, March 10. It is said that the royal visitor is interested to an unusual degree in ship building and has for a long time been desirous of studying the operations at present under way on the Delaware. It may be said that in reference to warship construction a time could scarcely be selected more opportune. The work at hand embodies a representation of the most formidable fighting craft in the world, and the latter are none the less interesting in that they are in various stages of construction. The Russian battleship Retvizan, now awaiting sailing orders for home, is a finished warship. The Cramps are proud of her because she was designed right here at home by Charles H. Cramp, president of the company, and none but Pennsylvania mechanics were employed in her building. The battleship Maine, which is under the shears rapidly receiving her boilers and engines, although radically different from the Russian fighter is none the less formidable. She is proceeding towards completion in strides which will make the question of her preliminary trial trip one to be considered at an early date by her builders. The armored cruisers, Pennsylvania and Colorado, are being plated, the former still remaining slightly in advance in percentage of completion. The work on the Turkish cruiser is at present confined to the shops. The Cramps deny that the purchase of material for this vessel, and the operations in the mold loft were suspended for a long period while the question of first payment was in abeyance. On the other hand, much of the preliminary work was under way before the first payment was made to Gen. Williams, the European representative of the ship building company.

The fourth annual banquet of the shipping men of Philadelphia was held last Friday night at the Hotel Bellvue. This organization, although young in years, has grown beyond the hopes of its founders. Upwards of 100 persons were at table representing capital of over $100,000,000. The series of toasts, differing from past precedent, had only to do with ships. Beginning with the "Building of the Ship" responded to by Edwin S. Cramp, the life of a modern ocean carrier was traced to its final end. In every response the unprecedented prosperity of the port formed a subject for congratulation.

Shipping interests of the port are agitated at present over the combine of all the Atlantic steamship lines trading here. It may be mentioned that the Philadelphia Transatlantic line has not entered into the deal. Following the announcement of the combine the advance in freight rates has been sharp, amounting to 100 per cent. in the instance of grain. The attitude of the local press implies that the tramp steamship will be driven out of the business owing to docking privileges being refused by the companies in the deal who control the elevators. At all events an interesting situation is at hand but it will probably be some time before its final significance is apparent.

The steamship Kroonland, building at Cramps ship yard, for the International Navigation Co., will be launched Feb. 18. The latter will be one of the most prominent events in the history of this great local industry. Work will speed on the Kroonland when once in the water as she is urgently needed for the company's exporting business with Europe.

At the last meeting of the directors of the Philadelphia Maritime Exchange, Charles E. Bushnell, secretary to the Atlantic Refining Co., was elected to membership. Mr. Bushnell succeeds George D. Ale, the former local representative of the Standard Oil Co., who has been transferred to the main office in New York.

The tug Clara, building at Lampson's Ship Yard, Bordentown, N. J., for Capt. George Murray and others of Philadelphia, will be towed to Neafie & Levy's Ship Yard for engines and boilers.

CONSTRUCTION OF TURBINE STEAMERS.

The service of the turbine steamer King Edward on the Clyde during the past summer has been so satisfactory that machinery on the same principle has been ordered for another vessel from the Parsons Marine Steam Turbine Co. This vessel is to be larger than the King Edward, as her length will be 270 ft. She will also be more powerful, as her speed will be 21 knots compared with the 20½ knots reached by the King Edward in her trial last June.

The ill-fated torpedo destroyers, Viper and Cobra, sufficiently proved that increased speed is secured by the use of the steam turbine machinery. But considerable doubt has been felt as to the fuel economy of this type of engine for marine work. In order to get trustworthy data on this point Capt. Williamson, the managing owner of the King Edward, has had a record kept of the coal burned during the season. As a means of comparison account has also been taken of the fuel consumption of a vessel of the same class, also running on the Clyde. This is the Duchess of Hamilton, a paddle-wheel steamer, built by William Denny & Bros., who also built the King Edward, and one of the most successful boats on the station.

The following results were obtained: The King Edward burned 1,429 tons 16 cwt. of coal, as against 1,758 tons 13 cwt. consumed by the Duchess of Hamilton. The total mileage of the King Edward was 12,116, of the Duchess of Hamilton 15,604. Miles per ton of coal for the King Edward thus works out at 8.47 compared with 8.87 for the Duchess of Hamilton, while the average speed of the King Edward was 18½ knots to 16½ knots for the Duchess of Hamilton.

"It is satisfactory to find," says a writer in the Times, "that by these figures the steam turbine, which offers so many advantages for marine propulsion, does not appear to suffer by comparison with ordinary engines in regard to fuel economy. No doubt the consumption per mile will appear high for a vessel of this size and shape when compared with that of vessels built more expressly for economy, such as cargo boats. Those who are accustomed to high speed, however, will recognize the price that has unavoidably to be paid for it, and high speed is an absolute necessity for a successful excursion steamer."

The Parsons company has now in hand the machinery for a new torpedo boat destroyer of somewhat the same type as the Viper, which was lost through running on the rocks off the Channel Islands during last year's naval maneuvers. Certain improvements are being introduced, the chief of which are designed to secure fuel economy. The vessel is expected to consume less coal both at highest speed running and under cruising conditions, although she will have the same speed as the Viper, about 34½ knots.

The Parsons company is also at present engaged on the machinery for three large yachts. One of these is being built to the order of Col. McCalmont, M. P. She will be fitted with Yarrow water-tube boilers and have a speed of 24 knots. Her length will be 152 ft. 6 in. and her width 15 ft. Another turbine-propelled yacht is under construction for Sir Christopher Furness. She will be of 700 tons measurement and 1,500 H. P. The third vessel is a large yacht for A. L. Barger of New York, her measurement being about 1,400 tons, length 260 ft. 8 in., breadth 33 ft. 3 in. The hull and boilers are being constructed by Ramage & Ferguson of Leith. The two latter vessels will be classed at Lloyds.

REPORT ON THE TORPEDO BOATS.

A discouraging report on torpedo boat construction has been submitted to the secretary of the navy by Naval Constructor J. H. Linnard and Lieut. L. H. Chandler who were appointed as a special committee to inspect the topedo boats and torpedo boat destroyers under construction on the Atlantic coast. The naval appropriation act, approved May 4, 1898, authorized the construction of twelve torpedo boats and sixteen destroyers at a cost not exceeding $6,900,000 for the entire twenty-eight. All but two of these vessels have been contracted for, but of the whole number only five have been accepted by the government. The board reports that the difficulties of fulfilling the contract requirements have been enormous, that the cost to the contractors is largely in excess of contract prices, and that some of these firms will be forced to the wall if the government holds them to the strict letter of their agreement. The report adds that a number of the vessels now approaching completion will probably fail to develop their stipulated speed rate, and that some of them will even fall below the rate that would permit of their acceptance after deducting penalties. All of these vessels which have been built on the department's designs are greatly over-weight and are subject to excessive vibration, which result in break-down when running at high speed. The contractor's contend that inasmuch as they bid on the department's designs they should not be held responsible for the failure to achieve the desired results. They ask for relief also on the ground that the cost of materials has increased enormously—60 per cent. in some cases—since the contracts were awarded, and that the aggregate cost of the vessels has been greatly enlarged by the expense of repeated trials resulting in repeated failure.

The report emphasizes the point that the building of torpedo vessels is a special industry in which American contractors, with one or two exceptions, have had but little experience. The serious consequences of this inexperience appears in the statement of the board that of the sixteen destroyers which have been inspected "probably not one will be an entirely successful vessel." The three torpedo boats built by the Bath Iron Works and accepted by the government, on their formal trials considerably exceeded the contract speed rate and are nearly within the weight limit prescribed in the designs. It is held that these vessels netted little if any profit to their builders. As to the torpedo boats building elsewhere, the board reports that some of them will be fairly good vessels while some will be flat failures. The board advises that contractors having torpedo craft under construction be dealt with leniently, as any harsh measures will involve them in severe and undeserved financial hardship. It is also recommended that the two-hour maximum speed for contract trials of torpedo vessels should be changed and a two-hour minimum adopted. This trial should be under full load of equipment with c al for 1,000 miles, and should follow a previous economy trial of twelve hours duration at moderate speed.

THE PACIFIC OCEAN NO LONGER PACIFIC.

According to the San Francisco Chronicle, "the Pacific ocean is fast losing the reputation implied in the name given to it by Magellan, and which it owes to the placid appearance of its surface when he first saw it. The change is one of the inevitable results of the growth of commerce. Prior to the discovery of gold in California comparatively few vessels sailed over its waters. There were, therefore, few casualties to report. In late years, however, commerce has extended in all directions. The ocean is filling with ships, and the disasters of the sea are multiplying proportionately.

"Along the California coast the ocean is placid enough to retain its reputation as pacific. Storms are rare. It is not often that its waters are lashed into fury like those of the Atlantic in these latitudes. But along the Oregon, Washington, British Columbian and Alaskan coasts there is little, if any, difference between the conditions prevailing in the Pacific from those existing in the Atlantic ocean. Mariners now dread Cape Flattery, at the entrance to the Strait of Juan de Fuca, almost, if not quite, as much as they do Cape Hatteras on the eastern coast. Wrecks are lining the northwestern coast of the continent as they do the northeastern shores of it.

"As the Pacific ocean is gradually filling with the white-winged and steam-propelled agents of commerce the ratio of shipwrecks is correspondingly rising. Perhaps we have witnessed more wrecks on this coast than we should have experienced if the same precautions against disaster had been adopted in the navigation of Pacific waters as is taken in the Atlantic ocean. The Pacific has undoubtedly been made the graveyard of many steam and sail vessels which were transferred to it from the Atlantic ocean because they were not considered safe to keep in commission in the latter, under the mistaken belief that milder weather and smoother water were to be found here. Others have been lost through the vicious practice of overloading, the risk being taken on account of the same error of opinion regarding the placidity of these waters. Ship owners are, however, fast learning that rotten hulks and overloaded craft are not any more immune from disaster here than they are anywhere else. The growth of commerce and the increasing perils of navigation resulting from it demand the abandonment of both."

M. B. McDonald, Noank, Conn., launched recently the fine three-masted schooner Charles H. Klinck, built for Carlos Berry of New London, W. E. Crockett & Co. of New York, and others. Her dimensions are: Length, 139½ ft.; beam, 35 ft.; depth, 12 ft.; capacity about 750 tons. She is well built throughout and is adapted for general trade. She will be commanded by Capt. A. E. Mehaffey.

TO RETAIN PACIFIC TRANSPORT SERVICE.

It is not likely that the transport service on the Pacific will be abolished after all. While Secretary Root recommended it the house committee on military affairs has decided to report against its abolition. The abolition of the transport service on the Atlantic has been of great advantage to the government. The transport service between the United States, Cuba and Porto Rico is now done by regular mail vessels at a very reasonable figure. There is no doubt that there would be a proportionate saving on the Pacific, but several army officers are opposed to the change. If this business was given to the various shipping lines it would undoubtedly stimulate the general commerce of the Pacific. At present there is no direct commercial connection with the Philippines. One of the objections raised to the abolition of the transports is that they could not be sold for what they cost the government. Secretary Root thinks it an extraordinary argument that the government should continue in a business at a very large loss simply because it could not sell its transports for what they cost when they had to be purchased under pressure in a time of war. The house military committee has agreed upon an appropriation of $25,000,000 for the army transport service.

In his testimony before the house committee Secretary Root said he hesitated to take steps for the abolition of the transport service against the judgment of the army officers, who were very largely in favor of its maintenance. "I have been rather loath to insist upon changes against the wish of the quartermaster general and the officers in charge of the transport service," said Mr. Root, "who are a unit against taking the transports off, because there is, of course, an immense responsibility. The transport service, as it has been run, has done an enormous amount of work, with very little loss of life and very little loss of property, and I should feel pretty badly if I insisted upon the change, and an accident were to come along which could be charged to the change I had made, as against the advice and protest of the officers directly in charge of it. I have been the less strenuous about that because I regard the transport service as temporary. I have already discontinued it on the Atlantic, and look forward to the time in the not very far distant future when we shall be able to discontinue it on the Pacific and have the work done by commercial lines—American vessels, under contracts which will provide for putting the vessels under military control or naval control in case of emergency. I will within a very short time have a bill introduced containing a provision looking to that."

The number of transports owned by the government is twenty-three troop and freight ships. Of these twelve are in service between San Francisco and Manila, two are in New York being fitted to carry troops, school teachers and insular employes to Manila. The Sedgwick is at New York out of commission, and the Seward is at Portland, Ore., out of commission. Six are in the Philippines performing local service. There are also in the Philippines, according to recent reports, two stern wheel steamers, five river boats, nine steam lighters, thirty-eight steam tugs, fourteen lighters, eighteen launches and three coal hulks. The average monthly cost of officers and crew of a transport troopship is about $5,750. The average cost of repairs to the large transports plying between San Francisco and Manila is from $10,000 to $20,000 after a voyage extending over three months. Much of this repair is due is considered more economical than the Pocahontas coal, which costs $9 per ton. The purchase of the higher price coal would cost more than the cost for repairs.

The chief reason why the committee has decided against the abolition of the Pacific service of the transports is on account of the figures presented below, which include suppositional figures for the same service by private lines.

Transport Hancock—Number of passengers carried, 7,126; freight and supplies, 7,237 tons; total cost for maintenance of ship, including wages of officers and crew, repairs, coal, water, pilotage, subsistence of crew, etc., $360,512; average cost for each passenger carried, exclusive of freight, about $50. By commercial lines the same service would have cost, at prevailing rates, $957,980, which is $596,868 in excess of the cost for the service by the transport. Many of the passengers of the Hancock were carried on short voyages.

Transport Thomas—Number of passengers carried, 7,027; supplies, 7,113 tons. Cost of the service, $385,302. Average cost per passenger carried, about $55. Cost of the same service by commercial lines, $1,107,736. Saving in favor of transport, $722,434. The Thomas was engaged in the longest voyages.

Transport Grant—Number of persons carried, 8,306; tons of supplies, 12,812. Total cost, $254,607. Average cost per passenger, about $30. Cost of the same service by commercial lines, $1,167,355, a saving of $921,748 in favor of the transport. The vessels above named have been on the service between San Francisco and Manila. Assuming that the service, if given to commercial lines, would be reduced one-half of the prevailing rates in consequence of competition, there would still be a large saving in favor of government transports.

Three transports are still engaged in service between New York and Manila. These are the Kilpatrick, McClellan and Buford. Here is the record of the year for those vessels:

Kilpatrick—Number of passengers carried, 990; tons of freight, 724. Cost of maintenance, $39,358. The service performed by the Kilpatrick, if performed by commercial lines, would have cost the government $118,590, or $79,231 in excess of the actual sum expended.

McClellan—Number of passengers carried, 289; tons of freight, 830. Cost of maintenance, $39,135. Cost of similar service by commercial lines, $49,812, an excess of $10,676 over that of the transport.

Buford—Passengers carried, 1,829; tons of freight, 383. Cost of maintenance, $82,596. Cost by commercial lines for similar service, $193,200, or $110,703 in excess of the transport service. In the case of the Buford it is explained that the cause for the excessive cost, compared with the Kilpatrick and McClellan, is that the Buford was required to call at several islands in the Philippines to gather in the troops she brought to the United States.

Supplies of fresh meat for the army in the Philippines have been brought from Australia, and these have been carried in supply vessels of the navy. From January, 1900, to March, 1901, a period of fifteen months, the quartermaster's department paid to the navy department for this service $174,934, which sum is charged to the cost of maintaining the army transport service.

A statement is also furnished showing the cost of maintaining the government transports in the service between New York and the West Indies. Owing to the withdrawal of the United States forces from Cuba and Porto Rico, leaving only small garrisons in each of those islands, the transports engaged in carrying troops and supplies were not employed to their full capacity, and, consequently, the cost of the service was largely in excess of the same service would be had it been performed by commercial lines. Thus the Rawlins carried 105 officers, 650 men and 300 tons of freight at an expense of $13,787, while the same service would have cost by commercial lines, $4,797 less than that amount. If the Rawlins, however, had been employed to her full capacity the cost to the government would have been but little more, while by commercial lines it would have cost $17,630, or $3,853 more than by the transport.

The Crook carried 678 officers and men, 444 tons of freight and 739 animals, and the cost of maintenance was $23,824. By commercial lines similar service would have cost $6,549 less than that sum.

The Sedgwick carried 909 officers and men, 2,771 tons of freight and 140 horses, at a cost to the United States of $24,153. Similar service by commercial lines would have cost $28,405, an excess over the actual cost to the government of $4,271. Had the Sedgwick carried to her full capacity the saving over the cost by commercial lines would have been $9,806.

Figures are furnished showing the aggregate paid for transportation to commercial lines for the six months ending Dec. 31, 1901, between the United States and Cuba and Porto Rico. The aggregate is $84,379, and it is estimated that outstanding bills for transportation will swell the amount to $100,000. In the period named there were carried to Porto Rico 218 passengers and 1,782 tons of freight; to Cuba, 731 passengers and 7,585 tons of freight; a total of 949 persons and 9,367 tons of freight. This service could have been performed by one transport in three trips. The average cost of a transport from New York to Porto Rico or Cuba is $10,220. For one trip per month for six months the cost would be $61,220. For this expenditure there could have been transported 2,920 passengers and 25,872 tons of freight. Two round trips per month of the transports would have performed all the required service in the matter of transportation of troops, miscellaneous passengers and supplies to and from Porto Rico and Cuba at an approximate cost of $120,000.

A GREAT MANUFACTURING REGION.

The Appalachian region occupies the major part of an interesting report on the "Mineral Resources of the United States" recently published by the United States Geological Survey. This region is the seat of the great mineral industry of the country, either in the production of raw materials or in their manufacture into the finished product. It embraces in whole or in part the states of New York, Pennsylvania, West Virginia, Southeastern Ohio, Virginia, Eastern Kentucky, Tennessee, Western Georgia, North Carolina and Alabama. A brief review shows that this region furnished over 6,000,000 long tons of iron ore of the total of a little over 27,500,000 tons for the whole country. The Lake Superior region in Michigan, Minnesota and Wisconsin furnished about 20,500,000 tons, leaving something like 1,000,000 tons for all the rest of the country. But when we follow this iron one step further, to its conversion into pig iron, we find that the Appalachian region, with Pennsylvania far in the lead, produced in round numbers about 9,500,000 long tons of the total output of 13,789,242 tons; and, if we follow this pig iron a step or two further, we find that this same region produced in round numbers about 4,500,000 long tons of the total of 6,684,770 tons of Bessemer steel ingots, about 2,850,000 long tons of a total of 3,398,135 tons of open-hearth steel, more than three-fifths of the total of 2,361,921 long tons of Bessemer steel rails, and about two-thirds of all the wire nails produced in 1900.

The explanation of this disproportion of manufactures is readily seen in the production by Pennsylvania of all but about 100,000 short tons of the output of 57,466,319 tons of anthracite coal; in the production by this region of a little over 67 per cent. of the total output of bituminous coal; in the production of fully 95 per cent. of the total output of coke; in the production of over 57 per cent. of the total output of 63,362,704 barrels of crude petroleum, and of natural gas to the value of about $16,000,000 out of a total of $23,606,223. The abundance of fuel of the region compels other sections to pay tribute to it. The iron ores of Lake Superior and the iron ores of Cuba alike find their way to the furnaces of Pennsylvania. West Virginia shows how powerfully transportation affects the region within itself and disembowels one state to feed another. West Virginia produced in 1900 in round numbers 22,600,000 short tons of bituminous coal, 4,747,000 tons of coke, 13,910,000 barrels of crude petroleum, and natural gas to the value of about $6,000,000, and yet she is credited with only 166,758 long tons of pig iron, and her production of steel and manufactured iron was not sufficiently important to cause her to be distinguished from "other states" in the reports.

IRON MINES IN SIBERIA.

Of the numerous iron ore mines in the Urals the largest are the Komaroff mine, containing 1,600,000,000 tons of 50 per cent. brown hematite, and the Magnithaya Gora mine, claimed to be the largest mass of magnetite in Russia, if not in the world. The Baikal mines are believed to contain 5,000,000 tons of ore in the portions belonging to the government and 16,000,000 tons in that owned by the Simsky works; and in the Elnitchi mines, near Baikal, about 1,000,000 tons of ore have been discovered. It is claimed that the latter group of mines, lying to the south of the Tcheliabinsk-Ufa branch of the Siberian railway, will yield 2,400,000,000 tons of iron ore. The Vyoskaya Gora, Mount Blagodat and Sindrsky mines are to the north of the same railway. Engineers say the first contains 16,000,000 tons; the ore in the second was estimated at 6,400,000 tons when first examined, but upon re-examination was found to amount to 13,000,000 tons. No definite estimate was made concerning the last mine, as it abounds in pockets which sometimes come to an abrupt termination. It is said that the Ural mines are capable of producing 24,000,000 tons of ore, or about 10,000,000 tons of pig iron, per annum for the next century. Conservative engineers, however, reckon the output at 5,000,000 tons a year, at which rate the ore in sight will last 200 years.

SEMI-CENTENNIAL OF SAULT STE. MARIE CANAL.

On June 4, 1903, will occur the semi-centennial anniversary of the breaking of ground for the construction of the first canal at Sault Ste. Marie, Mich., and a movement is on foot to make a national celebration of the event. Probably no single act has served so much to advance the material prosperity of the United States as the construction of this canal and it is fitting that the event should be commemorated by the nation. The commerce which passes through this canal is more than three times as great as that which passes through Suez notwithstanding the fact that the canal is closed to navigation during four months of the year. The enormous total of 28,403,065 tons of freight passed through this canal during the year 1901 of which 18,090,618 tons was iron ore. This canal opened the highway for these great deposits of iron ore which have done so much to revolutionize the manufacture of iron and steel and which have undeniably brought the center of the world's making of steel west of the Allegheny mountains. Were it not for the great mineral region which is reached through the Sault Ste. Marie canal the United States could not possibly have attained its commanding position in the industrial world. These facts are well known to those who live in the lake region.

The Sault Ste. Marie canal was the key which unlocked the door to the vast riches of the Lake Superior country. When one realizes today what boundless wealth lay in that country it is surprising that the government should ever have viewed with disfavor the construction of a canal at that point. But it certainly did. It declined to vote one penny for the construction of the canal, but, at a later date, it donated 750,000 acres of public lands to the state of Michigan to aid in the construction of the canal. A syndicate was organized to build the canal and on June 4, 1853, ground was broken.

The industrial progress of the world does not possess a more fascinating chapter than that which has to do with the development of the Lake Superior country. Iron ore was discovered in this region several years prior to the construction of the canal. There was no way of getting it to the furnaces of Ohio and Pennsylvania execept by hauling it in sleighs during the winter time from the mines to the shore of the lake and then waiting until the opening of navigation in the spring to put it aboard the vessels. The wagon roads were so execrable that it was impossible to haul it from the mines in the summer time. Then every pound of it had to be unloaded at the Sault and hauled in wagons around the rapids of St. Mary's river, where it was again loaded upon vessels. The struggling iron companies in the Lake Superior country, realizing the insuperable obstacles of reaching the markets, undertook the manufacture of iron in the shape of blooms in the peninsula. The primitive methods of transportation, however, made the carrying charges terrific and bankrupted the companies which attempted the manufacture of iron.

The subsequent construction of the canal proved the salvation of the iron country. The torrent of ore, started in 1855 with 1,449 tons, has grown in 1901 to 20,589,237 tons, and is annually increasing. Altogether since iron ore was discovered in this region a total of 192,008,221 tons have been shipped to the furnaces. Iron is the backbone of any country. Without it nations are spineless. The healthy red blood that is coursing through the industrial veins of the United States is formed by the iron of the Lake Superior country. The immeasureable advantage which the nation has in its great struggle for the world's export trade in steel lies in these self-same ore deposits and the cheapness of their transportation to the furnaces—thanks to a matchless waterway of 1,000 miles linked by the greatest canal, in point of commerce and lock dimensions in the world.

But iron ore is only one commodity. The grain trade of the northwest, already great and destined to be greater, has its outlet through the waterways of the great lakes, and must continue to increasingly use them in their order to successfully compete with other grain exporting countries.

The Review has repeatedly indicated the commercial results of the main items of the products passing through the canal, affording an object lesson to the world at large as to the effect of cheap transportation in a corner of the globe deemed quite remote from the established currents of commerce. The late Gen. Poe of the engineers' department in an official communication dated May 11, 1888, enclosed a report of Supt. Wheeler of the construction corps of the canal in which the latter stated that the cost of freight going by water was as .183 to .811 of the same going by rail between Lake Superior and Lake Erie ports and that the saving thus effected on the year's commerce amounted to $34,557,140. To this Gen. Poe added:

"It is not at all improbable that but for this water route the charges laid upon the freight carried would have amounted to $50,000,000. If this estimate is not exaggerated, and I think it is not, then the actual benefit to the producer and consumer was fully $40,000,000 in that single year divided among them in unknown quantities."

Since then the cost of water carriage by the introduction of larger vessels, the deepening of channels and the adoption of labor saving docking machinery has been greatly reduced, while that by rail has not been lessened materially. The saving is, therefore, greater than ever.

To briefly notice other leading industries, besides iron, which have been fostered by the canal, mention may be made of lumber. The upper peninsula of Michigan and those states bordering on Lake Superior have received a wonderful impetus in the lumbering trade. Copper, too, although far less in tonnage, exceeded, until late years, in annual values, the output of iron. One mine, the famous Calumet & Hecla, has paid out $70,000,000 in dividends and is still declaring them at a substantial rate. John Hays, the man who discovered the first copper mine, is still living in Cleveland, far past ninety years of age, but in the full possession of his faculties. It is to be hoped that he may attend the proposed semi-centennial anniversary of Sault Ste. Marie canal and lend unique interest to that occasion.

Soon after congress opened the way for the construction of the canal by donating public lands to the state of Michigan to aid in its construction a syndicate of some of the most eminent business men in the country was formed to build it. They took their pay in the public lands donated for that purpose. In order to make the canal firstclass they expended over 10 per cent. of the cost of the canal in doing extra work not called for in the contract. It is claimed that the Sault Ste. Marie canal has the unique distinction of being one of the most honorably executed contracts ever awarded by the national or state governments. It is interesting at this date to note that the government contract called for gates operated by man power backing up against long arms to the lock gates, as those in use on the Erie canal. The contractors substituted windlass movements at their own cost. The government also would have been satisfied with locks 250 ft. long by 50 ft. wide, but the contractors decided that the canal should admit the largest possible steamers then on the lakes and made them 350 ft. by 70 ft. in surface dimensions. Gen. Poe in his report of Dec. 20, 1886, remarks:

"They were magnificent structures in their day, and would still be useful if the commerce had not entirely outgrown them."

The contractors, after the contract was awarded to them as individuals were incorporated by a special act of the state of New York and numbered among their members the first president of the New York Central railroad, the chancellor of the university of New York, a governor of Vermont, the leading lawyer in Michigan and others of like standing. The work, when completed, had the distinction of having been the most rapidly and economically constructed public work of its kind and size in the history of engineering achievements, and, it is stated, has rarely been equaled in those respects. When it was begun no railroad existed within 400 miles of the location. The monthly mails were conveyed in winter by dog trains and almost all the economic conditions have since been practically revolutionized. These facts certainly render a semi-centennial commemoration most appropriate and interesting and worthy of national sanction as a most effective proof of national and industrial progress during the half century.

COMMERCE OF LAKE SUPERIOR COPPER REGION.

The commerce of Portage Lake ship-canals (famous copper region of Lake Superior) is very clearly shown in a report just forwarded to war department officials at Washington by Capt. D. D. Gaillard, United States engineer in charge of improvements in these waterways. For the first time in a great many years past there is a decrease in the total value of freight moved through these canals. Value of the commerce in 1901 was $56,876,480.65, against $57,380,129.05 in 1900. The principal tables from Capt. Gaillard's report follow:

FREIGHT BOUND UP AND DOWN THROUGH PORTAGE LAKE SHIP-CANALS AND VALUATIONS FOR THE SEASONS OF 1895 TO 1901, BOTH INCLUSIVE.

	Bound up, net tons.	Bound down, net tons.	Total freight bound up and bound down.	Total valuation of freight bound up and bound down.
1895	560,672	363,084	923,756	$29,832,367.70
1896	635,606	406,327	1,041,933	29,953,787.02
1897	730,843	289,880	1,020,723	34,044,268.85
1898	960,924	406,761	1,367,685	39,254,415.50
1899	974,328	607,841	1,582,169	54,994,843.70
1900	1,190,527	677,245	1,867,772	57,380,129.05
1901	1,246,576	867,809	2,114,385	56,876,480.65

ESTIMATED VALUE OF FREIGHT THROUGH PORTAGE LAKE SHIP-CANALS FOR THE SEASON OF 1901.

Items.	Designation.	Quantities.	Price per unit.	Valuation.
Coal, anthracite	net tons,	102,385	$5.50	$ 563,117.50
Coal, bituminous	net tons,	809,673	3.30	2,671,920.90
Flour	barrels,	283,730	4.00	1,134,920.00
Wheat	bushels,	901,450	.72	649,044.00
Grain (other than wheat)	bushels,	474,055	.50	237,027.50
Manufactured iron	net tons,	7,086	60.00	425,160.00
Pig iron	net tons,	3,622	16.00	57,952.00
Iron ore	net tons,	80,386	2.25	180,868.50
Salt	barrels,	125,293	.75	93,969.75
Copper	net tons,	78,354	335.00	26,248,590.00
Building stone	net tons,	67,231	6.50	437,001.50
Sand	net tons,	14,950	.75	11,212.50
Machinery	net tons,	1,235	300.00	370,500.00
Oils	barrels,	43,418	6.00	260,508.00
Limestone	net tons,	40,983	1.50	61,474.50
Lumber	M. ft. B. M.,	314,635	15.00	4,719,525.00
Logs	M. ft. B. M.,	18,074	11.00	198,814.00
Unclassified freight	net tons,	148,439	125.00	18,554,875.00
Total				$56,876,480.65

SHIP BUILDING AT NEWPORT NEWS.

Newport News, Va., Feb. 5.—The Newport News Ship Building & Dry Dock Co. will shortly come into possession of the large foundry formerly operated by Caskey Bros., located directly opposite the ship yard and on the railroad switch leading into the yard. As a result of the opening of the brass and iron foundry about 200 additional men will be employed in its operation at the start. The ship yard has not heretofore operated a foundry in connection with its mammoth works, but have always depended upon outside foundries for its brass moldings, and castings. This has frequently delayed work and caused inconvenience. The report of the purchase is confirmed by Gen. Supt. Walter A. Post, who stated further that the final transfer of the property will be made in a few days. The Caskey foundry is one of the best equipped in the south and was established about six years ago by Messrs. Hugh and William Caskey, of Philadelphia, who have been in the foundry business for some years in Philadelphia.

The battleship Illinois will have her final speed trial Feb. 15, according to the present arrangement. This trial is the last required by the government before the vessel is accepted and the final payment made. On the occasion of the official trial of the ship, she broke all records for battleships, making the phenomenal speed of 17.45 knots an hour on an average, when only 16 knots speed was required. The builders in this case will make an effort to exceed the official speed trial. The run will take place just outside of the Virginia capes. The battleship is now lying off the ship yard, making preparations for it. Not much preparation is needed, however, and about the only work being done is a repair job on one of the piston rods which had been slightly damaged before returning here from New Orleans. It is a high tribute to the ship yard, indeed, that this is the only repairing necessary during the six months the Illinois has been under probation, so to speak. Rear Admiral Robley D. Evans, who will command the special squadron which will meet Prince Henry, will raise his flag over the Illinois shortly after the final speed trial.

INTERESTING COLLISION CASE.

CIRCUIT COURT OF APPEALS REVERSES DECREE OF DISTRICT COURT IN GRAND TRAVERSE—LIVINGSTONE MATTER—LIVINGSTONE SOLELY AT FAULT.

As announced in a recent issue of the Review, the United States circuit court of appeals, second circuit, reversed the decree of United States District Judge Coxe in the Grand Traverse-Livingston collision case. Judge Coxe held both vessels at fault and divided the damages. The higher court holds the Livingston solely at fault. The opinion of the court of appeals is by Judge Lacombe, and is as follows:

This cause comes here upon appeal by the owners of the Grand Traverse from a decree of the district court, northern district of New York, holding both vessels in fault for a collision between the steam propeller Livingstone and the steam propeller Grand Traverse, and dividing the damages. The Livingstone did not appeal. The general facts of the collision are succinctly set forth in the opinion of the district judge as follows:

"The collision occurred about 5:30 in the morning of Oct. 19, 1895, when the steamers were on Lake Erie about a mile northwest of Colechester Light. The Traverse, a propeller 182 ft. long and 33 ft. beam, loaded with coal and merchandise, was proceeding up the lake on a voyage from Buffalo to Green Bay, Wis. Her course was W. by N. ¾ N. Her speed was about 8½ miles an hour. The Livingstone, a propeller 280 ft. in length and about 38 ft. beam, loaded with corn, was proceeding down the lake on a voyage from Chicago to Buffalo. Her course was E. by S. ½ S. Her speed was about 10½ miles an hour. The two vessels were thus on substantially opposite courses. The wind was blowing fresh from the west. Though dark at the time of the collision it was clear, and objects could be seen at a considerable distance. It was almost daylight. About half a mile ahead of the Livingstone was the Peshtigo, a propeller smaller and slower than the Livingstone, bound down the lake, substantially on the same course. Just prior to the collision, she passed the Traverse about a quarter of a mile to the northward. The members of her crew on watch at the time heard the signals given by the Traverse and saw the vessels when they came together. The collision occurred in the open lake, with plenty of room in which to maneuver, and with nothing in the condition of the wind or water to render navigation difficult."

As to the fault of the Livingstone, the district judge found: "When the vessels first sighted each other they were about 4 miles distant. Their masthead lights were first seen. They were then meeting nearly end on and rule 17 (which requires that each shall alter her course to starboard, so that each shall pass on the port side of the other) became applicable. When about 1½ miles distant the Traverse saw the red and green lights of the Livingstone and blew one blast, as required by rule 23, to indicate that she was going to the right. She ported half a point. This was correct seamanship. The Livingstone did not answer this signal and continued on her course. The first mate of the Livingstone, who had charge of her navigation at the time, testifies that he did not hear this signal; in fact, no one on the Livingstone heard it, if the testimony of her crew is to be accepted. There is nothing at all improbable in this story. The whistle of the Traverse was clogged with water. Her mate testifies that he blew an unusually long time before he could get a distinct response, and as the wind was blowing the sound directly away from the Livingstone it is not surprising that it was not heard. When the vessels were from three-quarters of a mile to a mile apart, the Traverse, seeing at that time only the range and red light of the Livingstone, repeated the signal and again ported half a point. There was no response from the Livingstone. When the distance had been reduced to a quarter of a mile, the Traverse blew a signal of one blast and ported a third time. The signal was heard by the Livingstone, but still there was no answer. Assuming the Traverse to be guilty of all the faults charged against her, what was the situation at the time the third signal was given?"

Answering the foregoing question, the district court says: "The vessels were then about a quarter of a mile apart, each could be seen by the other without the aid of lights. The Livingstone knew that the Traverse was directing her course to starboard. She knew it from the signal, and it was perfectly obvious without the signal . What then, was the manifest duty of the Livingstone? There can be no doubt that she should have ported also. Even had she kept her course there could have been no danger. There was but one thing possible for the Livingstone to do at this time to bring the boats into collision, namely, to starboard, and that was the one thing she did do. The proof establishes this proposition beyond a doubt."

It is unnecessary to discuss such proof here, for, by not appealing, the Livingstone has conceded that the court was correct in finding that she did starboard at this time, and that by such starboarding the collision was brought about. It was no doubt an amazingly stupid piece of navigation, but not unprecedented; whether the mate called out "starboard" when he meant to say, and possibly believed he did say "port"; or whether the wheelsman heard the order "starboard" and did the opposite we do not know; such things have happened before, and an appreciation of the extent of human infirmity, even among men experienced and ordinarily cautious, makes us unwilling to accept the theory of the court below that no navigator could have committed such an error (assuming him to be sane and not intoxicated) unless in some way or other the other vessel mislead him. We approach the consideration of the faults charged against the Traverse, therefore, without the postulate that an accident of this character, where the one vessel is concededly guilty of such gross fault, "could hardly have occurred without the concurring carelessness of the other." On the contrary we understand the rule as laid down by the supreme court to be that where fault on the part of one vessel is established by uncontradicted testimony, and such fault is, of itself, sufficient to account for the disaster, it is not enough for such vessel to raise a doubt with regard to the management of the other vessel. There is some presumption at least averse to its claim, and any reasonable doubt with regard to the propriety of the conduct of such other vessel should be resolved in its favor. The City of New York, 147 U. S. 72, 85. The Ludwig Holberg, 157 U. S. 60, 71. The Umbria, 166 U. S. 404, 409.

The first fault charged against the Traverse is that she displayed no red light. The district judge discussed all the testimony on this branch of the case, and giving the greater weight to that of the observers on the deck of the Livingstone reached the conclusion that the Traverse was thus in fault. In our opinion the testimony from the Livingstone is not as strong as it might be. Witnesses who observed the Traverse just after collision testified that there was no lantern before the red screen; had they said the lantern was there and unlit they would more strongly have corroborated the testimony of the navigator whose evidence on the other points the district court discredited, as we do. The evidence shows that the lantern was put in place at the proper hour and was observed afterwards before collision. It may have gone out but certainly it was not removed from the screen before collision. However we do not think it necessary to discuss the evidence, on this branch of the case, nor, on the whole, are we disposed to reverse the finding that the Traverse was not displaying her red light; but we are unable to concur in the proposition that such fault was instrumental in producing the collision. The district court found that when the vessels were a quarter of a mile apart and the third whistle of the Traverse was heard on the Livingstone the vessels were in a position of safety, which could be made unsafe only by the starboarding of the Livingstone. Had the latter ported or even held her course there could have been no danger; the vessels would have passed each other with a broad margin of safety. The witnesses from the Livingstone unite in the proposition that the position then was one of safety, though some of them put the Traverse on their starboard instead of their port bow and one of them, the mate, insisted that he ordered no change of wheel and that none was made. As before stated he was discredited by evidence from the deck of his own vessel, the wheelsman testifying that the mate ordered the wheel hard-a-starboard, that he put it there where it remained down to collision, and that the captain coming on deck then found it hard-a-starboard which the captain did not deny. The testimony overwhelmingly supports the proposition stated in the opinion of the district court that "the Livingstone took a sharp swing to port when the last signal was given from the Traverse and when . . . had she held her course or directed it to starboard the accident would not have occurred. . . . If the Livingstone had not starboarded at this supreme moment she would have passed the Traverse without difficulty." This is the only fault which the district court finds on the part of the Livingstone, and that vessel not having appealed, the accuracy of that finding is conceded. But at the moment the last signal sounded and before the mate of the Livingstone ordered her wheel hard-a-starboard, the vessels were a quarter of a mile apart and he could see the Traverse while her signal notified him as plainly as any lights would have done that she was directing her course to starboard. Indeed, when pressed upon cross-examination, this witness admitted that the one whistle heard by him gave him all the information needed, and that the absence of the red light made no difference. Of this statement it is said that it was made by a witness who did not commend himself to the court, and whose narrative in other particulars was found to be untruthful; but the situation itself gives sufficient support to this admission of the mate. Any intelligent man must have known from the whistle in what direction the Traverse was going to swing, and no light was needed to tell him that if he starboarded he would bring his own boat into peril. If failure by the Traverse to display a red light had put the vessels (as a consequence of navigation prior to sounding of the last signal) "in a position of danger where the slightest fault might bring disaster," her failure in that regard might fairly be held to have contributed to the catastrophe. But it must be accepted that the position when the last signal sounded was one of safety, and that peril and disaster came thereafter only as the result of an amazing piece of stupidity in the navigation of the Livingstone. For this reason we cannot hold that failure by the Traverse to display a red light was a fault contributing to the disaster.

It is further charged that the Traverse displayed no range light on her mizzen mast or main mast. The testimony to support this proposition is less persuasive than that touching the absence of a red light but it need not be discussed because, conceding the fault, it did not contribute to the accident for the reasons already set forth.

It is further charged that the Traverse had no lookout. The facts are these: When the Livingstone was sighted the traverse had on deck her navigator (the mate), wheelsman and stationed lookout. The lookout saw the mast-head lights of the Livingstone before the first signal, and reported them. He then took the wheelsman's place (the latter being sent aft to examine the log) and remained there till collision. No other vessel interfered in any way with the navigation of either of the colliding vessels, no other was visible except the Peshtigo far out of reach, and which was also reported long before collision; the Livingstone was sighted and seen by all when miles away; her colored lights were made out a mile and a half off, signal of one whistle blown to her and the navigation of the Traverse conducted with reference to her; the view was clear and unobstructed, and so far as the evidence shows nothing of any character or description occurred concerning the approach of the Livingstone of which the navigator of the Traverse was not advised from personal observation. Uuder these circumstances we are not prepared to say that the absence of a lookout contributed to the injury. The Victory and the Plymothian, 168 U. S. 429.

It is further charged as a fault that the Traverse did not stop and reverse. Under the findings of the district judge in which we concur, the position of the two vessels was one of safety until the unexpected starboarding of the Livingstone. Up to that time therefore no rule required the Traverse to stop and reverse, and afterwards she was so near the jaws of collision that, in view of the gross fault of the Livingstone, she should not be held liable for an error of judgment committed in the brief moment allowed her navigator to decide, especially as it seems highly probably that she would not thereby have averted collision.

The decree of the district court holding the Grand Traverse liable is reversed with costs of this appeal and cause remanded with instructions to hold the Livingstone solely at fault. The principal attorneys in this case were Mr. Canfield of Detroit, and Mr. Kremer of Chicago, for the Livingstone and Goulder, Holding & Masten, of Cleveland, for the Grand Traverse.

The United States training ships Alliance and Lancaster are at anchor in Hampton Roads. Both ships exchanged crews this week. The Alliance has just received a new keel which gives her about 12 in. more draught, enabling her to better float to the wind under sail. Her propeller has been dispensed with, and she consequently depends entirely upon her sails.

NEW JERSEY TYPE PLACED AHEAD OF ALL.

From the Engineer, London.

Methods of classifying warships are legion. There is an official one common to most navies, whereby almost every ship is "first-class" to satisfy or delude the taxpayer; there is the statistical expert's system, whereby the class of any ship depends almost entirely upon the things to be proved; and, finally, there is the naval officer's system, based chiefly upon an unwritten instinct. This last is a rule-of-thumb system, invariably acknowledged to be "about right" by the impartial, but difficult to formulate further. Attempts to do so have been made by adding up energies of fires, but since energy implies armor penetration, and penetration as a factor of naval warfare is nearly dead by now, the "energy of fire" is not a reasonable method. By what means then is the generally accepted naval computation arrived at? No one knows. Probably it is instinct alone that decides whether a ship is first or second class. Yet by taking results and working backward it is possible to find a mathematical formula which gives correct results.

Recently we published some particulars of a new method introduced into the naval war game, whereby units of fire are arrived at. Roughly, this is that two 6-in. = 1½ medium = 1 big gun. This, of course, is accepted all over the world as an approximate truth. Here, then, is one axiom to proceed on, and a means of reducing gun-fire to a common denomination is placed in our hands.

There remain armor, speed, handiness, and coal endurance. Of these, coal endurance is not a tactical feature, so may be discounted in assessing tactical values. Speed and handiness for equal dates are usually about equal. Tactically, they are of value rather for single ship actions than for fleet actions. It is practically as impossible to assess them as it is to assess personnel, and, like personnel, they may be omitted in seeking a common denomination of fighting value, so long as we recognize that the ship that is better armed and armored has, in 90 per cent. of cases, superiority in speed and handiness, and that these qualities in a high degree in an isolated ship are of no value to the fleet as a whole. This reduces us to armor only. Now, so far as naval officers are concerned, the vast majority hold that, in reason, all armor is equally efficacious, and is little likely to be penetrated. Without any straining of probabilities we may therefore put the "knockout" blow from penetration of a belt in the same category as a machinery breakdown; that is to say, count it as a negligible factor in determining a general value. This leaves us with little to assess save the relative values of armored and unarmored guns. In part by working backward, in part by acting on instinct, we may, seeking only a general approximation, arrive at the following: 1 gun armor protected = 3½ to 2 partially protected by armor = 4 unprotected.

Something of this sort is generally accepted by all who, discarding purely paper questions, reckon—without probably troubling to trace the mathematical steps of the problem—that where guns are unprotected, "crushing by superior fire" has been worked for, and internal arrangements to limit shell effect introduced largely; else the one to four proportion might not stand well. Great as the protection of armor is, casement backs are vulnerable, and a shell hitting a casement or battery is almost certain to damage muzzles, while an unarmored ship it might pass through and burst beyond. Yalu produced many instances of this.

Of displacement we have taken no count, the reason being that to possess a superiority of guns and armor, together with the increased speed, handiness, etc., for which all naval architects aim, increased displacement is an implied necessity, and chiefly a strategical quality.

Here, then, are some ships worked out upon this system, by which most ships fall naturally into classes. Where ships come upon the margin, determination must be left to such items as torpedo tubes, coal endurance, speed, age, displacement, etc., but otherwise this exceedingly simple rule will apply:

Reduce all guns of and over 4-in. 12-pounders and the like being fitted for repelling torpedo boats—to the unit of fire denomination. Multiply every armor-protected gun by four; partially protected by from three and a half to two, according to the amount of armor, with a reduction if that armor is obviously barely proof against 6-in. shell, and count each unprotected quick-firing gun as a unit. The result will give, approximately, the relative fighting value of the ship as opposed to others.

As it is somewhat interesting, we have placed after our figures the classifications given by three of the naval annuals—Lord Bassey's "Naval Annual," by "All the World's Fighting Ships," and by the "Naval Pocketbook"—to all recognized battleship types in the lists below. Obviously, all these classification systems count in other things than mere fighting value. We have fixed seventy as the dividing line between first and second class while second-class ships must exceed forty. "Officially," all the battleships introduced are "first class"—save a few coast defence ships.

Now, of the relative values arrived at by this system, it may certainly be said that in most cases they tally closely with naval ideas. The naval man sees an immense gap between the Majestic and Royal Sovereign classes, with a big gap again between this latter and the Admiral class or the Sanspareil. The low figure of merit of the Sanspareil may come as a surprise, but no one carefully thinking out that ship's construction is likely to arrive at a widely different result. The high value of the Cressy and other armored cruisers is in accordance with French ideas, and, we may add, ideas fairly common over here too. Though pretty dicta about the inability of the armored cruisers to fight in the line are laid down in print, none can dispute that the only difference between them and battleships is in big guns, and a very slight inferiority in armor. Their one drawback is that the concentrated energy of the big gun may deal some vital blow, but against that we may well put their high speed, which, in a fleet of them, would be a counterbalancing factor. Mathematically, therefore, it would look as though those who characterize the French theory as foolishness were the foolish ones. As regards the French fleet, the figures here reached fit closely to the usual French view that the Suffren is fully equal to our London. The Bouvet works out better than the Charlemagne—a claim that has been made in France. Her gun positions cause a loss of broadside fire, but against that we may place the longer survival of four big gun positions against two.

German ships work out at an unexpectedly high figure of merit. It may be observed that Germans always contend for the superiority of their designs, claiming that the excess volume of fire more than counterbalances a slight loss of protection. The United States, which manages on paper, at all events, to get the maximum of both, is, of course, still more to the fore. By no paper calculations can American new designs be shown to be elsewhere.

Russian new design, as exemplified by the Borodino class, does not show up well. No advance upon the Poltava is indicated, and both types barely reach the first rank. The Poltava, by reason of the absence of submerged tubes, is relegated to the second rank. The two types, of course, are armed with the same number of guns. The Italian Victor Emanuele comes still lower. She, of all ships, is avowedly a compromise, and, of necessity, great sacrifices are made in her to secure strategical qualities that do not concern purely tactical values—ship against ship.

The system enunciated above is, of course, equally applicable to cruisers.

Names of ships.	Figure of merit.	This system.	CLASSED "Naval Annual."	CLASSED "Fighting ships."	CLASSED "Naval Pocketbook."
BRITISH.					
King Edward (8 × 4) + (8 × 4) + (10 × 4)	= 104	1	1	1	1
Majestic (8 × 4) + (8 × 4) + (4 × 3)	= 76	1	1	1	1
London (8 × 4) + (8 × 4) + (4 × 3)	= 76	1	1	1	1
Royal Sovereign (8 × 3) + (4 × 4) + (6)	= 46	2	1	2	1
Trafalgar (8 × 4) + (6 × 2½)	= 47	2	2	2	1
Centurion (8 × 4) + (2 × 4) + (3)	= 43	2	2	2	1
Anson (8 × 2) + (6)	= 22	3	2	3	1
Sanspareil (4 × 4) + (2) + (6 × 1½) + (6)	= 33	3	2	2	1
Cressy (4 × 3) + (12 × 4)	= 60	4	3	4	2
Thunderer (4 × 4)	= 16	4	3	4	2
FRENCH.					
Republique (8 × 3½) + (6 × 4) + (12 × 3½)	= 94	1	1	1	1
Suffern (8 × 3½) + (10 × 4) + (8)	= 76	1	1	1	1
Charlemagne (8 × 3½) + (8 × 3) + (2) + (8)	= 62	2	1	1	1
Bouvet (8 × 3) + (8 × 4) + (8)	= 64	2	1	2	1
Marceau (8 × 2) + (17)	= 33	3	2	3	1
Jemappes (4 × 4) + (1½)	= 17½	4	3	3	4
Jeanne d'Arc (3 × 3) + (8 × 3) + (6)	= 39	3	—	—	—
Leon Gambetta (6 × 3½) + (4 × 4) + (12 × 3½)	= 79	1	—	—	—
GERMAN.					
Wittelsbach (8 × 3½) + (12 × 4) + (6 × 3)	= 88	1	1	1	1
Kaiser Friedrich (8 × 3½) + (18 × 3)	= 82	1	1	1	1
Brandenburg (12 × 2½) + (3)	= 33	3	1	2	1
Aegir (6 × 3) + (3)	= 21	4	4	4	4
Furst Bismark (8 × 3½) + (2 × 4) + (10 × 3)	= 66	2	c	2	c
RUSSIAN.					
Borodino (8 × 3½) + (12 × 3½)	= 70	1	1	1	1
K. P. Tavsitchesky (8 × 4) + (16 × 4)	= 98	1	1	1	1
Trisvititelia (8 × 4) + (8 × 4) + (2)	= 66	2	1	1	1
Poltava (8 × 3½) + (12 × 4)	= 70	2	1	2	1
Gromovoi (3 × 4) + (3 × 1½) + (12 × 3) + (4)	= 56½	2	—	—	—
Peresviet (8 × 3) + (8 × 4) + (2 × 3) + (1)	= 63	2	1	2	4
Apraksin (6 × 2½) + (4)	= 19	4	4	4	1
JAPANESE.					
Shikishima (8 × 4) + (8 × 4) + (6 × 3)	= 82	1	1	1	1
Asama (6 × 4) + (10 × 4) + (4)	= 68	2	—	—	—
ITALIAN.					
Brin (8 × 4) + (6 × 4) + (12 × 4)	= 104	1	1	1	1
V. Emanuele (4 × 4) + (12 × 4)	= 64	2	1	1	1
Sardegna (8 × 2) + (8) + (8)	= 32	3	1	3	1
UNITED STATES.					
New Jersey (8 × 4) + (12 × 4) + (12 × 4)	= 116	1	1	1	1
Maine (8 × 4) + (14 × 4) + (2 × 3)	= 94	1	1	1	1
Kentucky (8 × 4) + (6 × 3) + (7 × 4)	= 78	1	1	1	1
Indiana (8 × 3½) + (8 × 2) + (4)	= 48	2	1	2	1
California (6 × 3) + (14 × 4)	= 74	1	—	—	—

SHIP YARD NOTES.

The ship building industry in Belfast looks very promising for the coming season. In addition to the three-masted schooner which will be built by G. A. Gilchrist, the Pendletons of Isleboro will build a four-masted schooner of about 1,000 tons in their Belfast yard. The work of getting out the lumber for this vessel has already begun. The ship yard, which is the one formerly owned by C. P. Carter & Co., and recently purchased by the Pendletons, will be supplied with a saw mill.

Kelley, Spear & Co., Bath, Me., launched from their yard on Jan. 25 the schooner Lizzie M. Parsons. The new schooner is intended for the Southern pine trade and will be commanded by Capt. Nathaniel Falker of Bath. Her dimensions are: Length, 171.9 ft.; depth, 13.3 ft.; beam, 35.5 ft.; gross tonnage, 655; net tonnage, 571.

Neafie & Levy, Philadelphia, will lay the keel in a few days for the new steamer Middlesex, building for the Weems Steamboat Co. Her dimensions will be 205 ft. over all, 61 ft. beam over guards, 36 ft. beam molded and 12 ft. depth of hold. She will be a side-wheeler and will have compound engines.

The five-masted schooner Prescott Palmer was successfully launched at the New England yard, Bath, Me., last week. The Palmer's length is 288 ft. and gross tonnage 2,811; carrying capacity, 4,000 tons. She will be commanded by Capt. David Sumner, formerly of schooner Rebecca Palmer.

The Baltimore Marine Railway Machine & Boiler Works, Baltimore, Md., is building a wooden fish steamer for the Atlantic Construction Co., 62 William street, New York. The steamer will be 140 ft. long, will be equipped with a fore-and-aft compound engine and will cost about $33,000.

Kelley, Spear & Co., Bath, Me., have just stretched the keel for a new steamer for the Maine Central railway. Besides the steamer two big barges for the Staples Coal Co. and the tow boat for the Commercial Towboat Co. of Boston are under construction.

Percy & Small, Bath, Me., will shortly launch a schooner of the following dimensions: Length, 255 ft.; beam, 45 ft.; depth of hold, 27½ ft.

Keel for a five-masted schooner will be laid at the yards of Arthur Sewall & Co., Bath, Me., in a few days.

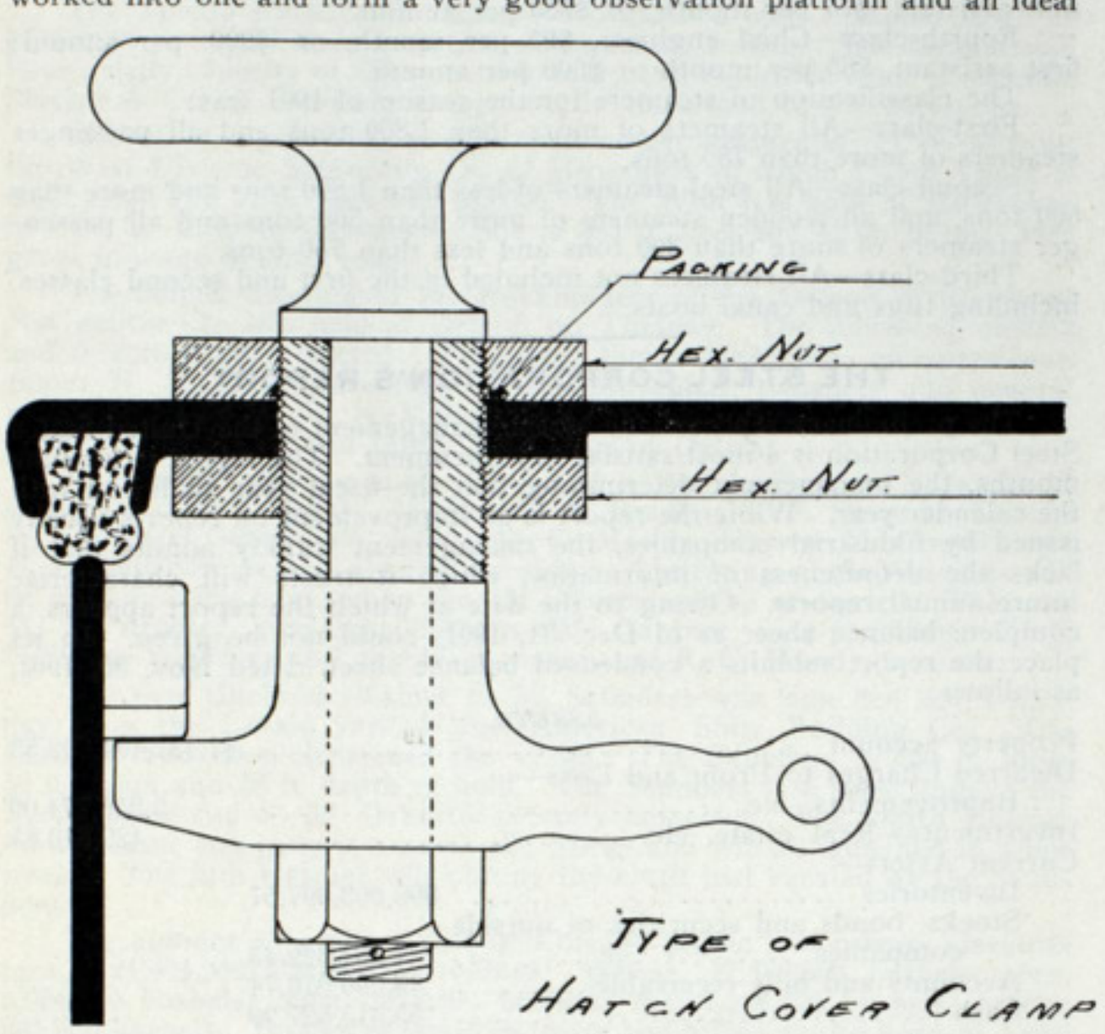
George A. Gilchrist, Belfast, Me., is building a 600-ton schooner for George McQueston of Boston.

The twenty-first annual reception and ball of the Marine Engineers' Beneficial Association, No. 2, of Cleveland, will be held at the Chamber of Commerce, Cleveland, on Friday evening.

CONSTRUCTION OF TORPEDO BOATS AND DESTROYERS.

BY GEORGE H. WILSON.

The general arrangement of the deck (main or upper), having been outlined, consideration must be given to the arrangement between decks and to the arrangement of the hold. As regards the location of the officer's and crew's quarters on these boats there seems to be a diversity of opinions among naval men and designers. Of course the idea of the "old navy" with its "quarter deck" boats has been carried into the "new navy." The "quarter deck" is a feature of the present day and with the "quarter deck" comes the natural association with the "quarters" located below this deck, called the "officer's quarters." The "forecastle" with its "crew's quarters" has also descended to our "new navy." The carrying out of these ideas of the olden times does very well on boats having the features necessary to its proper working, but in the torpedo boat and destroyer a different class of boats and an entire change in conditions is confronted. There is no "quarter deck" which calls for the adjacency of the "officer's quarters," but there is somewhat of a substitute for it and that is the "forward conning tower platform" and the "bridge." These two are generally worked into one and form a very good observation platform and an ideal



TYPE OF HATCH COVER CLAMP

place to command in an engagement. With the only place of command, observation, or seclusion from the boat's crew, located in the forward part of the boat it follows that for an officer or officers to gain so important a station at short notice they should be quartered in the vicinity.

The officer's quarters were located forward in quite a number of the earlier boats, but owing to various opinions they were shifted aft in the later designs. These opinions seem to lack the approval of those most interested in this important question, namely the officers who are to command. The original idea that these boats, no matter how small, must have a retinue of officers similar to that of the larger boats in the navy, that is a captain, executive officer, lieutenant and an officer in charge of machinery. The absurdity of this number of officers on a boat a little larger than a good sized tug-boat is obvious. In the attempt to provide quarters (forward) for them with the necessary ward-room, pantry and water-closet, the first few boats were a failure as far as comfortable quarters were concerned. With this failure, or mistake, came another mistake to the rescue, namely the quartering of the officers in the after part of the boat, instead of retaining the quarters forward and diminishing the number of officers required to serve on such boats.

An officer in command of the boat, and one or two others, one to take charge of the machinery and the other, although hardly necessary, to be a watch officer. With this complement of officers there would be no difficulty in arranging suitable and commodious quarters in the forward part of the boat.

A general outline of a suitable arrangement between decks of a torpedo boat and a destroyer would not be out of place at this point. For a torpedo boat, starting from the stem, a good arrangement is as follows:

From the stem to collision bulkhead, paint and oil room above the breast hook, trimming tank below; access by means of a manhole in collision bulkhead. From the collision bulkhead to the next water-tight bulkhead windlass room above flat, trimming tank or small store room below; windlass room fitted up as lamp room and for small stores; access through hatch in turtle deck. From bulkhead to the forward conning tower captain's or commanding officer's state-room, above flat, ward-room stores below, access through door in bulkhead to ward-room. From conning tower to the forward end of boiler-room ward-room with two folding berths on the sides, ward-room pantry and water closet above flat, ammunition-room and water tanks below, access to officer's quarters through hatch in conning tower, and to steward through small hatch on deck. Boiler and engine spaces with coal bunkers on the side in the boiler space. The assembling of both engines (in twin-screw boats) in one engine room has more advantages than disadvantages and hardly affects the safety or efficiency of the boat. Abaft the after bulkhead of the engine room is generally located the galley space, although, if the disposition of the weights requires it and space allows of it, the galley can be located just forward of the forward boiler room bulkhead. Below the galley space aft is located the portable water tank and the galley stores. In the space abaft of the galley (if located as in the former case), the machinists and firemen can be quartered with access by means of a hatch on deck; below these quarters the after magazine is generally located. Abaft this space the petty officers are quartered with ship's stores and engineer's stores below, access through hatch on deck. The entire space abaft of this can be devoted to the crew, the tiller or quadrant room being fitted up as a store room for them. Space is provided where necessary and where possible for water closets and wash rooms, lockers, etc.

In a boat of the destroyer type more room being available both in length and breadth, a more elaborate arrangement can be conceived and a better boat designed than in some of the boats now in service and being built.

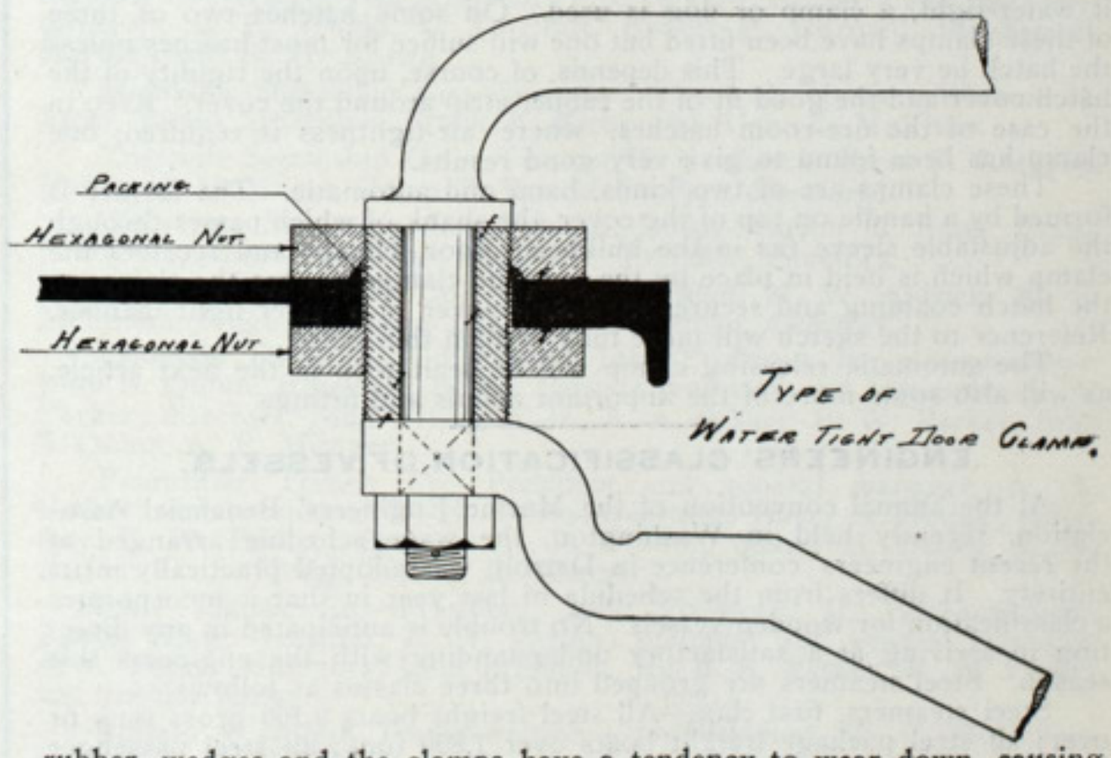
The same general arrangement as has been outlined for a torpedo boat will hold good for this type also, the only changes being that larger and more commodious quarters can be provided and a semblance of privacy can be attained in keeping the various classes of the crew separated by bulkheads into their respective compartments, such as firemen, machinists, petty officers and crew.

On these boats, as in boats of the smaller type, there is no pressing need for a great number of officers, three being all that are absolutely necessary. One good officer with large experience and able to command, will more than equal two of minor importance. From a selfish point of view it behooves the naval officer to urge that the complement of officers on these boats be kept down, in that it will enable the officer's quarters to be made considerably larger and at the same time will add considerable space to the working parts of the boat and increase her efficiency in every respect.

Having outlined the construction of these boats in previous articles and having gone into the general arrangements in this article, the details or fittings and the general finish of the boat should receive the consideration which they demand. It is a well known fact to all ship builders that when the hull of a boat is completed the work has only commenced, as the fittings have to be put in and when it comes to a naval vessel they are well aware that they are of the greater importance.

With so large a field to cover it is rather hard to choose a starting point, but I will begin with the water-tight door, as that is a very important detail. These doors are made in different ways; one method being to dish and flange the outer edge of the door-plate, using no angles to stiffen it; another being to flange the plate and stiffen it with two angles, or using the long hinge pad as a stiffener; another method is to omit the flanging and work an angle all around the edge to engage the rubber in the door frame; still another method is to flange the plate all around and to work an angle all around, just inside of the flange, forming a groove to receive the rubber. In the former cases the rubber is worked in a frame around the edge of the door opening. In the latter the angle frame is worked around the edge of the opening to engage the rubber on the door-plate. In the matter of hinges there is not much to be said except that they can be cast of composition, and if necessary extend all away across the door-plate to act as a stiffener; the hinges should be made to allow for the take-up of the clamps, as a hinge-bound door does not give entire satisfaction. The door-clamps, or dogs, should be sufficient in number to make the door water-tight under all circumstances. They should be made of wrought steel or iron to withstand the blows to which they are likely to be subjected. The ordinary wedge of composition is the most practical as it presents a good working face.

In the practice of the past the clamps have been made in two parts, bolted through the bulkhead and made water-tight by means of rubber washers, etc. After the door has been in use no great length of time the



TYPE OF WATER TIGHT DOOR CLAMP.

rubber, wedges and the clamps have a tendency to wear down, causing the clamps to work loose in the bulkhead and in a short time the door fails to be water-tight as the clamps cannot set it up perfectly tight. A new and thicker piece of rubber is generally inserted in the door frame to overcome this difficulty.

To obviate this I would suggest that the type of door clamp now used on two or three of the destroyers be adopted as a more efficient fitting. By a reference to the sketch it is readily seen where this clamp is an improvement over that now in general use. By means of the double nuts and the threaded sleeve through the bulkhead the wear and tear on all the parts is easily taken care of. This also provides a means whereby the door may be perfectly adjusted when first put in and at all other times. The cost and weight are no greater than in the present type.

For a sliding door, to be worked by hand, the vertical type is the most satisfactory and the easiest handled. The ordinary graduated wedge door frame is the best type known and when fitted with the adjustable wedge pieces the door has given perfect satisfaction. For emergency

cases, when the door is required to be lowered instantly, the screw rod is fitted with a slip nut which is released by knocking out a pin.

To obtain actual water-tight bulkheads, the fewer doors there are in them the more perfect will they be.

I will next call attention to the hatches in these boats which will be divided into two classes namely, the upper and lower deck.

As the former of these will demand the greater amount of attention I will outline its distinctive features and the best way at present which is being adopted to meet all the requirements.

These hatches and their fittings have gone through a course of improvement since they appeared in the earlier boats and have received considerable attention at the hands of the designers.

The coamings are generally made about 6 in. high to prevent the wash water, etc., from coming in when open. The various styles of covers afford ample material for discussion. One manner of making these is to dish the plate and flange it all around as in the bulkhead doors and it makes a very light and fairly rigid cover. There was a tendency to rack or change shape, but this could be overcome by increasing the weight of the plate. Another hatch cover is made by dishing the plate and working a double angle all around to receive the rubber. Another style is formed of a flat plate with a double angle worked all around and two angle stiffeners worked across the cover. Another method, which is considered most favorably by designers and ship builders, is to flange a flat plate all around and work a small angle around inside of it, forming a groove to receive the rubber. There are also two angle stiffeners worked across the cover.

In the earlier types of hatches the rubber was fitted at the upper edge of the coaming, the flange or angle of the cover engaging it. This is very bad practice from the fact that the rubber is continually being kicked out of place and stepped on; the oily and greasy hands of the crew are constantly taking hold of it, rendering it liable to deterioration and decay; coal dust, ashes, ash cans and other bulky packages likewise contribute to the rapid decline of its efficiency. In the later types the rubber is always secured to the cover, either by flat strips fastened by screws or in the groove formed by the angles or the flange.

The hinges are a very important fitting, as they have to act in conjunction with the springs which help to raise the cover. The hinges can be made long enough to act as stiffeners in lieu of the angles previously mentioned. There are two very important functions that can be performed by the hinge and these are to act as a stop for the cover, preventing it from opening wider than required and to supply an arrangement for taking up the wear on the hatch-springs.

Four springs are usually fitted to a hatch of the ordinary size and the size of the wire and the material of which it is made are two very important matters. Birmingham steel was the only kind found to answer all the requirements and give the best results; a spring made from 3/16-in. to ⅜-in. wire, according to the weight of the cover, was found to give the best results and to hold its life the longest. The springs, fastened to the cover and working over a rod called hinge-rod, is easily carried to the hinge lug, which has a number of holes in an arc of a circle; a pin passed through the proper holes and through the eye of the spring secures the required tension.

A detail which is being fitted with great success on these hatch covers is the "carriage-hinge" "stop and lock." This simple device is nothing more than a carriage-hinge secured to the cover inside and to the inside of the hatch coaming. It prevents the cover from opening too far, when unlocked, and when open it holds the cover in that position until the hinge is "broken" by the hand, when the cover can be closed. There are generally two of these fitted to a cover and instead of a hinge rivet being used at the joint, a long rivet or rod is worked between the two hinges which acts as a grab when breaking the joint to close the cover.

For securing the cover when in the closed position and for making it water-tight, a clamp or dog is used. On some hatches two or three of these clamps have been fitted but one will suffice for most hatches unless the hatch be very large. This depends, of course, upon the rigidity of the hatch cover and the good fit of the rubber strip around the cover. Even in the case of the fire-room hatches, where air-tightness is required, one clamp has been found to give very good results.

These clamps are of two kinds, hand and automatic. The former is formed by a handle on top of the cover, the shank of which passes through the adjustable sleeve (as in the bulkhead door clamp) and receives the clamp which is held in place by the nut; the clamp engages the clamp on the hatch coaming and secures the hatch cover in a water-tight manner. Reference to the sketch will more fully explain this fitting.

The automatic releasing clamp will be dealt with in the next article, as will also some more of the important details and fittings.

ENGINEERS' CLASSIFICATION OF VESSELS.

At the annual convention of the Marine Engineers' Beneficial Association, recently held in Washington, the wage schedule arranged at the recent engineers' conference in Detroit, was adopted practically in its entirety. It differs from the schedule of last year in that it incorporates a classification for wooden vessels. No trouble is anticipated in any direction in arriving at a satisfactory understanding with the engineers this season. Steel steamers are grouped into three classes as follows:

Steel steamers, first class—All steel freight boats 2,100 gross tons or over; all steel package freight boats over 1,800 tons; all steel passenger steamers over 1,200 gross tons.

Second class—All steel freight steamers not included in first class; all steel passenger steamers under 1,200 tons and over 300 tons.

Third class—All steel steamers not included in first and second classes and all passenger steamers under 300 tons.

Crew list—All first-class steamers having water-tube boilers or more than three boilers of any kind, three engineers and two oilers and water tenders when required; all other first-class steamers not included in above, two engineers and two oilers; all second-class passenger steamers, one oiler.

All second-class steel steamers from 1,000 to 2,100 tons, having water bottoms and auxiliary machinery such as electric light engines, steering capstan engines, windlasses, blowing engines, hoisting engines, running shaft line, etc., two engineers and two oilers; all second-class steel steamers from 1,000 to 2,100 tons having water bottoms, steering engines and windlass engines only, two engineers and one oiler.

Wage scale—First class, chief engineer, $150 per month, or $1,500 per annum; first assistant $100 per month, or $960 per annum; second assistant, $75 per month.

Second class—Chief engineer, $125 per month or $1,350 per annum; first assistant, $90 per month, or $840 per annum.

Third class—Chief engineer, $105 per month, or $1,100 per annum; first assistant, $75 per month, or $720 per annum.

The classification of wooden steamers is as follows:

Wooden steamers, first-class—All steamers over 1,200 gross tons; all package freight boats over 750 tons.

Second-class—All steamers under 1,200 tons and over 600 tons.

Third-class—All steamers under 600 tons and over 200 tons.

Fourth-class—All steamers not included in above classes.

Crew list—All first-class boats over 1,500 tons, not less than one oiler; all first-class package freight boats, two engineers and two oilers; all first-class boats under 1,500 tons, two engineers and one oiler.

Wage scale, first-class—Chief engineer, $125 per month, or $1,350 per annum; first assistant, $90 per month, or $840 per annum.

Second-class—Chief engineer, $114 per month, or $1,100 per annum; first assistant, $84 per month, or $800 per annum.

Third-class—Chief engineer, $105 per month, or $1,000 per annum; first assistant, $75 per month, or $700 per annum.

Fourth-class—Chief engineer, $95 per month, or $900 per annum; first assistant, $65 per month or $600 per annum.

The classification of steamers for the season of 1901 was:

First-class—All steamers of more than 1,800 tons and all passenger steamers of more than 750 tons.

Second-class—All steel steamers of less than 1,800 tons and more than 500 tons, and all wooden steamers of more than 500 tons and all passenger steamers of more than 300 tons and less than 750 tons.

Third-class—All steamers not included in the first and second classes, including tugs and canal boats.

THE STEEL CORPORATION'S REPORT.

The preliminary report made by the management of the United States Steel Corporation is a most satisfactory document. The report is for nine months, the management determining that the fiscal year shall end with the calendar year. While the report is an improvement on reports usually issued by industrial companies, the management frankly admits that it lacks the definiteness of information which it trusts will characterize future annual reports. Owing to the date at which the report appears, a complete balance sheet as of Dec. 31, 1901, could not be given. In its place the report submits a condensed balance sheet, dated Nov. 30, 1901, as follows:

ASSETS.

Property account		$1,437,494,862.53
Deferred Charges to Profit and Loss—		
Improvements, etc.		3,256,774.09
Investments—Real estate, etc.		429,613.25
Current Assets—		
Inventories	$95,603,997.57	
Stocks, bonds and securities of outside companies	7,251,329.45	
Accounts and bills receivable	48,090,916.74	
Cash	55,315,527.99	
		206,261,771.75
		$1,647,443,021.62

LIABILITIES.

Capital Stock—		
Common	$508,212,543.70	
Preferred	510,173,778.40	
		$1,018,386,322.10
Capital stocks of subsidiary companies not held by United States Steel Corp.		771,925.81
Bonded Debt—		
United States Steel Corporation bonds	$303,450,000.00	
Funded debt of subsidiary companies.	59,349,838.85	
Debenture scrip	41,844.57	
		362,841,683.42
Mortgages and purchase money obligations		19,067,791.58
Current Liabilities—		
Pay rolls and accounts payable	$22,228,343.60	
Bills and loans payable	12,653,744.27	
Special deposits	5,435,342.15	
Accrued interest	4,870,410.16	
Common dividend payable Dec. 20, 1901	5,081,790.00	
		50,269,630.18
Contingent liabilities		525,398.67
Sinking funds and reserves for depreciation		21,236,040.54
Surplus		174,344,229.32
		$1,647,443,021.62

Accompanying the balance sheet is a very clear explanation of its figures. It is, for instance, pointed out that the $95,603,000, under the head of "inventories" on Nov. 30 represents the actual cost of material, including labor, and that the largest single item, which is $34,700,000 for iron ore, is made up of the necessary accumulation of tonnage during the summer and autumn for conversion during winter and spring, when, owing to the close of navigation, mining and shipping are restricted. The finished product is represented in the inventory in the sum of $15,322,000. The large amount of this item is due to the fact that the corporation could not get cars to deliver the product to its customers. In explanation of the $21,236,000 charged to sinking fund and reserves, it is stated that the sinking fund for the 5 per cent. bonds of the United States Steel Corporation was, at the date of the balance sheet, $1,520,000, and the sinking fund for bonds of the subsidiary companies, $1,264,197. There is set aside for general depreciation and for extraordinary outlays for improvements or renewals the sum of $18,451,000. All the stock of the subsidiary companies has been converted into stock of the United States Steel Corporation, with the exception of $771,000.

AROUND THE GREAT LAKES.

Capt. W. E. Morris will sail the steamer William F. Sauber the coming season.

Mr. Fred Saal and Mr. Chancy Morgan will represent the Pittsburg Coal Co. in the fuel department during the coming season.

The lake steamer John Rugee has been sold to the George Hall Co., Ogdensburg, N. Y., for $50,000. The steamer is of 1,216 tons and was built in Milwaukee in 1888.

Henry E. Smith of Owen Sound, secretary of the Northern Navigation Co., died at Toronto last week. Mr. Smith was forty-three years old and was well known in the upper lake trade.

Congress has been asked for an appropriation for a life-saving station at Eagle harbor by the Masters' and Pilots' Association, recently in session in Washington. It is conceded that a life-saving station is badly needed at this point.

The steel steamer Kearsarge of Pickands, Mather & Co.'s fleet has been chartered for the season by the Canada-Atlantic Transit Co. The Kearsarge will trade between Chicago and Depot Harbor and Capt. R. McDowell of Cleveland will sail her.

The Toledo Furnace Co. has been organized with a capital stock of $1,000,000 to establish and operate a furnace at Toledo. The furnace will have a daily capacity of 350 tons of foundry and malleable iron. Pickands, Mather & Co. of Cleveland are primarily concerned in the enterprise.

Mr. W. H. Becker has bought the wooden steamer W. H. Wolf from the West Division Steamship Co. of Milwaukee of which David Vance is manager. The price paid was $65,000. The Wolf was built in Milwaukee in 1887 by Wolf & Davidson. She is 285 ft. keel and 42 ft. beam. Her gross tonnage is 2,265 tons.

The annual meeting of the stockholders of the Detroit & Cleveland Navigation Co. was held at Detroit on Tuesday. The following officers and directors were elected: President, James McMillan; vice-president, James H. McMillan; secretary, Philip McMillan; treasurer and general manager, William C. McMillan. The directors are the officers and George M. Hendrie and James McGregor of Detroit.

The annual meeting of the Cleveland & Buffalo Transit Co. was held at Rockport on Tuesday. Messrs. M. A. Bradley, T. F. Newman, George W. Gardner, George W. Avery, R. C. Moody, Harvey D. Goulder and D. C. Shurmer were re-elected directors. A meeting of the directors will be held in a few days, when the old officers will be re-elected. They are M. A. Bradley, president, George W. Gardner, vice-president; T. F. Newman, secretary and general manager, and R. C. Moody, treasurer.

The new Gilchrist steamer E. M. Saunders was launched last Thursday from the Lorain yard of the American Ship Building Co. Miss Caroline Saunders christened the vessel. The Saunders is 400 ft. long, 50 ft. beam and 28 ft. depth of hold. The Saunders is a sister ship of the F. W. Hart and F. M. Osborne recently launched. The fourth steamer for the same company is now on the stocks and will be launched in a few weeks. The fifth steamer will occupy the berth just vacated by the Saunders.

The amount of grain stored in Chicago public and private elevators now is 21,901,900 bushels, as follows: Wheat, 11,630,000 bushels; corn, 6,934,000 bushels; oats, 1,872,000 bushels; rye, 1,184,000 bushels; barley, 281,000 bushels. Stocks of grain in store and afloat at the head of Lake Superior embrace 10,414,253 bushels of wheat, 250,000 bushels of corn, 175,754 bushels of oats, 452,664 bushels of rye and 263,118 bushels of barley—11,555,789 bushels in all. The stock of flaxseed in store and afloat is 1,424,936 bushels.

The following shipping masters have been appointed for the coming season: A. R. Rumsey, chief shipping master, Cleveland; William Wall, assistant shipping master, Cleveland; J. W. Hanson, chief shipping master, Chicago; Gordon Ratteray, assistant shipping master, Chicago; L. T. Rumsey, shipping master, South Chicago; William Jamson, shipping master, Milwaukee; Edward Nesbitt, shipping master, Buffalo; Charles Fisher, shipping master, Conneaut; William Dibble, shipping master, Ashtabula; Patrick Mitchell, shipping master, Toledo.

The annual meeting of the new Detroit & Buffalo Transit Co. was held in Detroit on Tuesday of this week. The following officers were elected: President, George Hendrie; vice-president, Thomas F. Newman; treasurer, W. C. McMillan; assistant treasurer, George M. Black; secretary, B. C. Wilder; directors, W. C. McMillan, George Hendrie, F. S. Masten, Calvary Morris, Harvey D. Goulder, T. F. Newman, A. C. Angell, B. C. Wilder and A. A. Schantz. William C. McMillan was appointed general manager. The new officers elected were: B. C. Wilder, A. A. Schantz and George M. Black.

A special from Duluth says that the Eastern Minnesota & Great Northern interest is to increase the length of its new ore dock on Allouez bay, Superior, 6,000 ft., adding 100 pockets, representing 30,000 gross tons and giving the entire dock a storage capacity of 100,000 gross tons. This will make the dock the largest ore shipping structure in the world. It is also the highest, being 72 ft. from the water to the top of the rails. The Eastern Minnesota road expects to ship 3,000,000 tons the coming season. Duluth at present has the largest ore docks in the world, two exactly alike, owned by the United States Steel Corporation.

The Cleveland-Cliffs Iron Co. broke ground this week for a shaft at its new property at Negaunee, Mich. George Mass, who negotiated the deal for the sale of land to the corporation, had the honor of raising the first shovel of earth from the proposed shaft. The mine has been named after Mr. Mass. Preparations for the starting of the shaft have progressed for nearly four months past. Hoisting and pumping machinery have been installed, trestles have been built to be used in carrying the ore rock from the pocket, and a dozen or more buildings mark the scene, which promises to be one of great activity in the future. It is conceded that the new property just opened up will be the largest mine in the city in time, as large bodies of high grade ore have been located with the aid of diamond drills.

Two big steel freighters were launched last Saturday by the American Ship Building Co.—one at Cleveland and the other at South Chicago. The steamer at Cleveland was the W. H. Gratwick, building for the Etna Steamship Co. of which Capt. John Mitchell of Cleveland is manager. The Gratwick is one of four steamers building for the companies managed by Mr. Mitchell. She is 436 ft. over all, 416 ft. keel, 50 ft. beam and 28 ft. deep. She will have triple-expansion engines with cylinders 22, 38, 53 in. by 40 in. stroke. Steam will be supplied by two Scotch boilers, 13 ft. 2 in. in diameter by 11½ ft. long, to be allowed 170 lbs. pressure. She will carry 6,200 tons on 18 ft. draught. The steamer launched at South Chicago was the W. W. Brown, building for the United States Transportation Co., and named for the manager of the company. She is 366 ft. over all, 346 ft. keel, 48 ft. beam and 28 ft. deep. She will carry 4,800 tons of freight on 18 ft. draught.

The stockholders of the Pioneer Steamship Co. and the Buckeye Steamship Co. held their annual meeting wednesday at Cleveland and re-elected all their old officers, as follows: Pioneer Steamship Co.—Directors, J. T. Hutchinson, John B. Guthrie, Walton McGean, Thomas F. Griffin and Charles L. Hutchinson: president, J. T. Hutchinson; vice-president, John B. Guthrie; secretary, Walton McGean; treasurer and general manager, Charles L. Hutchinson. Buckeye Steamship Co.—Directors, W. S. Manuel, Martin Mullen, John B. Guthrie, Capt. John McNeff, Charles L. Hutchinson,: president, W. S. Manuel; vice-president, John B. Guthrie; secretary, treasurer and general manager, Charles L. Hutchinson.

The committee on aids to navigation of the Lake Carriers' Association, after a conference with a special committee of the Ship Masters' Association, has made the following recommendations of aids to navigation and will shortly take the subject up with the authorities at Washington: Rauleaux ranges at Point Aux Pins; eight gas buoys in the straight channel at Toledo, four on each side of the channel, gas buoy in the river near Craig's ship yard and a buoy near Presque isle; range lights on Point Edward near the mouth of St. Clair river. The Point Edward ranges were recommended by the masters because several strandings have occurred after the lightship was removed on account of ice, leaving the dangerous channel unmarked.

Gas buoy for the lower end of St. Clair canal cut on the east bank; three gas buoys to mark the American channel at Stag island, St. Clair river; two gas buoys to mark the St. Clair middle ground; elevation of the beacons and range lights at St. Clair flats from the canal to Hurson's island.

For Lake Superior: A fog whistle for Michigan island; a lighthouse and fog whistle at Rock of Ages near the western end of Isle Royale; a fog whistle at Sand island, and a gas buoy to mark the channel in the Soo river near the Dark Hole.

In Lake Michigan: Gas buoys for Manhattan shoal near Death's Door, North Graham shoal, Hog island reef; Driscoe shoal, Green bay; South Fox island shoal, Boulder shoal, south of Gull island, and a gas buoy for Major shoal in the Straits of Mackinaw; gas buoy for Garden island shoal; permanent lighthouse and fog whistle to be placed on Racine reef; light and fog signal on outer waterworks crib off Chicago harbor.

For Lake Erie the committee recommended a light and fog signal at Point Abino and gas buoys for Seneca and Waverly shoals near Buffalo.

All the Detroit transportation companies held their annual meetings Tuesday and elected officers as follows:

White Star line—President, A. A. Parker; vice-president, L. C. Waldo; treasurer, John Pridgeon, Jr.; secretary and traffic manager, Charles F. Bielman; general manager, B. W. Parker. Directors, A. A. Parker, B. W. Parker, John Pridgeon, Jr., T. H. Newberry, C. F. Bielman, L. C. Waldo, James H. Muir, Robert T. Gray and A. W. Colton.

Roby Transportation Co.—John B. Roby, president; John W. Donaldson, vice-president; L. C. Waldo, secretary and treasurer.

Northwestern Transportation Co.—Harvey H. Brown, president; Stephen E. Hartnell, vice-president; L. C. Waldo, secretary and treasurer; directors, L. C. Waldo, C. T. Pratt, Robert P. Hartnell, Stephen E. Hartnell and H. H. Brown.

Michigan Steamship Co.—Directors, Frank J. Hecker, Watson M. Freer, James McMillan, Frank E. Kirby and Alex. A. McVittie.

Yosemite Steamship Co.— Truman H. Newberry, Cyrus E. Lothrop, Phillip H. McMillan, Henry B. Joy, M. E. Farr, directors.

Wolverine Steamship Co.—John B. Roby, Watson M. Freer, Frank J. Hecker, James McMillan, and A. A. McVittie, directors.

American Steamship Co.—James McMillan, M. W. Aldrich, W. C. McMillan, Hugh McMillan and M. B. McMillan, directors.

Pridgeon Transit Co.—President, John Pridgeon, Jr.; vice-president, John S. Quinn, treasurer, B. W. Parker; secretary and treasurer, A. A. Parker; directors, John Pridgeon, Jr., A. A. Parker, B. W. Parker, John S. Quinn, A. R. Munger.

Peninsular Transit Co.—President and general manager, A. A. Parker; vice-president, W. H. Oades; treasurer, Harry S. Hodge; secretary, B. W. Parker; directors, A. A. Parker, Walter H. Oades, B. W. Parker, H. S. Hodge and A. R. Munger.

State Transit Co.—President, John Pridgeon, Jr.; vice-president, Joseph King; treasurer, B. W. Parker; secretary and general manager, A. A. Parker; directors, John Pridgeon, Jr., A. A. Parker, B. W. Parker and Joseph King.

Buffalo & Duluth Transportation Co.—President, W. C. McMillan; vice-president, W. K. Anderson; treasurer and manager, A. A. Parker; secretary B. W. Parker; directors, A. A. Parker, B. W. Parker, Truman H. Newberry, W. C. McMillan, W. K. Anderson.

Swain Wrecking Co.—President, L. C. Waldo; vice-president, John S. Quinn; treasurer, B. W. Parker; secretary and manager, A. A. Parker; directors, L. C. Waldo, A. A. Parker, B. W. Parker, John S. Quinn and Martin Swain.

Stewart Transportation Co.—President, George Peck; vice-president and manager, A. E. Stewart; secretary and treasurer, Charles F. Bielman; directors, J. J. Barlum, C. F. Bielman, George Peck, George Lesher and A. E. Stewart.

It is learned from Montreal dispatches that construction work has been begun on four new vessels for the Canadian Pacific railway. A ship building firm on the Clyde has the contract for construction. The vessels will be larger than the present Empress liners, whose route they will take between Vancouver and the orient, and will have a speed of 20 knots.

COMMERCIAL EXPANSION OF THE UNITED STATES.

BY MR. CHARLES A. GARDINER, OF THE NEW YORK BAR.*

The most vital economic problem now confronting this nation is the expansion of our foreign commerce. Agriculture is no longer our dominant industry. Following the commercial evolution of Europe, within the last few years the great economic energies of this continent have shifted from agriculture to manufactures; and so stupendous and illimitable are the forces pouring into our new industries that, like an overwhelming tidal wave, they have filled up the home markets, and, rushing irresistibly onward, have flooded all the markets of the world. In five years our exports have exceeded our imports by $2,500,000,000. Foreign nations are alarmed and are following Austria's advice to "fight shoulder to shoulder against the common danger." Thoughtful Americans are solicitous for the future. They realize that our manufacturing energy is abnormal. If it grows with its present momentum and constantly increasing markets are not provided, the result must be a hopeless glut in production, stagnation of manufactures, strikes, panics, and general prostration of industries and trade. Hence the supreme question—how to enlarge our markets and expand our foreign commerce?

Reciprocity is offered as a universal panacea, but we know little about it. Protection we know. It has grown with our growth and expanded with the nation. The policy of no section, it is continental and American. For 125 years it has been as fundamental to our commerce as is the constitution to our government. Foreign nations have always recognized it and have made their treaties and adjusted their trade relations on the basis of our established protective system. Free trade, also, we know. As commerce justified, we have gradually reduced our tariffs. In 1900 our total imports were $849,841,184, and our free imports $367,336,866, or 43.2 per cent. of the whole. Excepting England and Germany, our free imports are the largest in the world; while within our continental bounds forty-nine great and prosperous commonwealths enjoy the most perfect free trade and over the greatest area ever known in history.

But what is reciprocity? "It is an easy word to say," remarked Andrew Carnegie, "but a difficult policy to inaugurate." That is the trouble, and no more cogent truth has been stated on the subject. "Reciprocity," says Senator Lodge, "is an integral part of the protective system." No more an integral part than is free trade. The two are antagonistic economic principles. Reciprocity reduces duties, disintegrates protection, and leads straight to free trade. As a general policy, also, it is futile. The essence of reciprocity is the concession of special tariff rates to one country at the expense of others. If reciprocity should be extended, concessions would multiply; and should it become general and concessions be made to all, then all concessions to one would necessarily be nullified. Trade would resume its natural course. Our protective tariff would be reduced without the slightest gain in foreign markets. Hence, if carried to its logical conclusion, general reciprocity could only result in general reduction of customs all around the world, and, the circle completed, the result would be universal free trade. Its general application, moreover, would revolutionize our international relations. It would abolish our historic policy of equity to all nations, special privileges to none; it would abrogate the "most favored nation" treaties; finally it would lead to reprisals, trade wars and all those international entanglements against which Washington particularly warned us.

Why is it assumed that reciprocity, and reciprocity alone, will expand our commerce? It is based on a mistaken conception of President McKinley's address. He did not advocate reciprocity as a general or permanent policy. He did not claim it as an integral part of our industrial system. He simply called attention to our "almost appalling" prosperity under protection, and suggested reciprocity without injury to the home market as an experimental outlet for our surplus. But no single panacea can better our trade with all the world. Reciprocity is only one of many valuable aids, some to be used in one country, some in another. The commercial situation is ever complicated. We must analyze it, segregate nation from nation, consider our trade relations with each, and then suggest such specific remedies as specific conditions require.

GREAT BRITAIN OUR BEST CUSTOMER.

(1.) First in importance are our trade relations with the British Empire—a domain of 16,662,073 square miles and 387,000,000 people—the largest area and the largest number of civilized inhabitants under one political organization on the globe. A third of a century ago our exports to Great Britain were $225,090,224, and in 1900 they were $533,819,545, an increase in thirty-three years of 137 per cent. During the same period our exports to British Africa increased 1,013 per cent.; to British Australasia, 421 per cent.; to British India, 1,126 per cent., and to British America, 322 per cent. In 1900 our exports to the entire world were $1,394,483,082, of which we shipped to British dominions $702,070,802, or 50.34 per cent. of the whole, and to Great Britain alone $533,819,545, or 38.28 per cent. of the whole. During the same year our exports to Germany and all German colonies were 13.43 per cent.; to France and all French colonies, 6.22 per cent.; to Italy, 2.31 per cent.; to Russia, three-quarters of one per cent., and to the Austrian Empire, only one-half of one per cent., of our export trade. In other words, our British exports were three and three-fourths times our German, eight times our French, twenty-one times our Italian, seventy times our Russian, and 100 times our Austrian; more than double our exports to Germany, France, Italy, Russia and Austria combined; one-third greater than to all continental Europe, and more than our exports to all the rest of the world.

England demands no reciprocity. She has adjusted her commerce to our protective system; and so long as that policy is substantially maintained with her and her European trade rivals, so long will she give us free trade; and she can do nothing more. Hence, our British commerce, if expanded at all, must be expanded by other means than reciprocity. During the past third of a century British expansion has been phenomenal and our British trade has increased in exact proportion. As England has grown, so have our exports. The corollary is, if you curtail British territory or British influence, you necessarily curtail American commerce. Anything that benefits England benefits one-half of our exports; anything that injures England injures one-half of our foreign trade. If Russia should drive England from India, if British supremacy should cease in South Africa, our commerce would irretrievably suffer. If the mills of Manchester and Liverpool and Leeds should shut down, if England should cease to buy our corn and wheat and beef and oil and copper and countless other agricultural and mineral products, financial loss would fall on millions of American producers. In short, any calamity to England, any halt in her growth, any staggering under her burden of empire, any wavering or faltering or turning back in her national progress, would injure our commerce as no other international event could do.

AMERICA'S TRADE SUPREMACY.

Unquestionably the scepter of empire and the seat of finance and trade are passing westward, from England to the United States. Our exports now lead the world; our manufactures will soon follow; our national resources are unequaled; our population is excelled only by Russia; and our aggregate political forces are the most powerful among the nations. In all essential elements of nationality England is now second and the United States first. But our predominance does not mean England's decadence. The change simply follows the evolution of the race—the new England on a vast continent, grown larger and richer and stronger than the old England in her island home. And, notwithstanding this change, America needs England today more than ever before, and that, too, an England buoyant, expanding and progressive, with constantly increasing markets for our goods; not an England pessimistic, contracting and decaying, that would not want and could not purchase our surplus products. And England, fostering mother of nations, bowing under the weight of empire, turns away from the Old World and stretches out her hands to her offspring, her first born, America—she needs our inexhaustible wheat fields, and never failing food supply, and unlimited raw materials, and above all the friendship and moral support of this great republic with its 80,000,000 kindred people.

Henceforth England and America will increasingly recognize their mutual needs and common interests, and the more complete such recognition the more will our commerce expand throughout the British empire. No reciprocal trade treaties nor preferential duties will mark their alliance, yet their commercial union will gradually grow more perfect than between any other independent sovereignties. The two nations now number 135,000,000 strong. They rule 320,000,000 more. Within all their borders human intelligence has the freest scope, public conscience is the most powerful, law is the most respected, crime meets the swiftest punishment, and their energies are combined in evolving the highest good of mankind; and isolated from the rest of the world, and that isolation increasing, but no longer isolated from each other, England and America will hereafter in all divisions of the world's affairs be found, more and more together, fostering common commercial interests and pursuing common commercial action, for their common good.

TRADE RELATIONS WITH EUROPE.

(2.) In sharp contrast are our relations with Continental Europe. In 1900 our exports to the continent were $508,806,508, 36.5 per cent. of our total exports, 72 per cent. of our exports to the British empire, and 95 per cent. of our exports to Great Britain alone. To Germany our exports were $187,347,889, or 13.45 per cent.; to France, $83,335,097, or 6 per cent.; to Italy, $33,256,620, or 2.31 per cent.; to Russia, $10,488,419, or .75 of 1 per cent., and to Austria $7,046,819, or one-half of 1 per cent. of our foreign exports. Europe is our second best customer; we also are Europe's second best customer. Europe is threatening to exclude our trade; she should realize that we can also exclude her trade. Europe sells us products which compete with our own and which protection is fast enabling us to produce as well as herself; she buys from us food products, raw materials and manufactures, not a dollar's worth of which can she buy elsewhere and as cheaply. Here is no basis for reciprocity as defined by President McKinley. "We should take from our customers," he said, "such of their products as we can use without harm to our industries and labor." We have always done so with Europe and are doing so now, and if we take less in the future it will be because Europe has no more than we "can use without harm to our industries and labor."

Europe, said Washington, has its own "set of primary interests which to us have none or a very remote relation"—so remote in fact that we have ignored them in making reciprocity treaties or other compacts with the rest of the world. But a reciprocity treaty with any nation in the continental system would flagrantly violate the principles of the farewell address, heretofore observed as the corner stone of our international polity. The pending French treaty, for instance, would admit French goods to our market 20 per cent. cheaper than similar British goods. If similar treaties were made with Germany, Italy and other continental rivals of England, British trade with us would be ruined. "Free trade England," says Senator Lodge, "cannot make reciprocal arrangements with other nations, because she has nothing to give." But how long would that continue? How long would England tolerate such gross and palpable injustice? Swift retaliation with tariffs and preferentials throughout the British empire would place an embargo on our commerce and drive home our goods from the four quarters of the globe. We could better afford sacrifices in our continental trade than such retaliation from our largest and most friendly customer.

EUROPE'S TRADE HOSTILITY.

Austria, purchasing only one-half of 1 per cent. of our exports, and even then selling us 27 per cent. more than she buys, is inciting Europe to a bitter trade war. "The peoples of Europe," said her minister of foreign affairs, "must fight shoulder to shoulder against common danger (American exports), and must arm themselves for the struggle with all the means at their disposal." Italy's present admiral and former minister also recently used this language: "The peace of Europe would perhaps lead European nations to consider the possibility and necessity of uniting against America . . . as the future of civilization will require them to do." France is intensely agitated, and demands reciprocity; and Germany, next to Austria, bitterly resents our invasion of her markets, and her parliament is even now proposing to enact the highest tariffs ever imposed on American exports. Why such fervid rhetoric and ill-advised action? We are still Europe's second best customer; we are threatening no commercial

*An address delivered before the New York Credit Men's Association.

wars; we have committed no trade crimes or misdemeanors; our policy is as it has been for 125 years. Europe's only indictment against us is that we have grown great, powerful, self-productive, and independent of her products. That is true, but we do not intend to stop growing, nor curtail our commerce, nor reverse our trade policies. When Europe wants our food products, she will, as heretofore, buy them or go without. When she wants our cotton, she must buy it or shut down her mills. So with nearly all her American purchases. "It is folly in one nation to look for disinterested favors from another," said Washington, and Europe following the rule, buys not as a "disinterested favor" to us, but because she is today more dependent for her imports on America than on any other single nation in the world.

America is determined to cause no avoidable commercial injury to Europe, so Europe should cause none to us. We want no trade wars anywhere; we desire peace and amity with the continent as fervently as we do with the rest of the world. In case, however, of irreconcilable trade conflicts, we must follow the advice of Washington and Adams, and still, as heretofore, "consult our rights and duties, and not our fears."

CANADIAN TRADE MOST IMPORTANT.

(3.) North and South America are united geographically, and by "a set of primary interests," as John Quincy Adams said, "which have none or a remote relation to Europe." Hence, in expanding our commerce on this hemisphere, we must recognize such a set of geographical, political, and commercial interests between all its people, as does not exist between them and the rest of the world. Of all countries on this hemisphere, our relations with Canada are most important. Great Britain first, Germany second, then Canada, are our three best customers.

In 1854 the United States and Canada entered into a reciprocity treaty more sweeping than anything permitted under the Dingley act. It continued in force until 1866, and was then abrogated. Our worst financial panic was in 1857, and the civil war demoralized our trade relations from 1860 to 1866, creating in our markets an abnormal demand for Canadian products and making development of our own industries impossible. It may be argued that no deduction can fairly be drawn from the treaty of 1854. But Canada's exports actually increased 220 per cent., while ours declined 14 per cent. In 1898 Canada established a preferential duty of 25 per cent. on imports from Great Britain. With what result? In 1897 Great Britain supplied 26.43 per cent. of Canada's imports, and although by 1900 they had increased 50 per cent., yet this was only 24.77 per cent. of Canada's entire imports—a loss in spite of the preferential. The United States in 1897 supplied 55.39 per cent. of Canada's imports. In 1900 they had increased 100 per cent., which was 60.75 per cent. of her total imports; an increase in spite of the preferential. Thus even a tariff preference has not induced Canadians to prefer British to American goods. On the contrary, they disregarded the preferential and doubled their American imports.

In 1900 our exports to Canada, less precious metals, were $109,844,378. Canada's exports to us, less precious metals, were $39,931,833. Canada thus bought from us 275 per cent. more than she sold to us, while all the rest of the world bought only 50 per cent. more. We thus put Canada in our debt $69,912,545—and this, too, although we taxed her on dutiable goods 49.66 per cent., just double what she taxed us, 24.83 per cent. We sell three times as much to Canada as the Dominion sells to us. "Why should we make concessions?" asks Senator Gallinger. Standing at the gateway of Canada, President McKinley must have had her people and such inquiries particularly in mind when he said: "We must not repose in fancied security that we can forever sell everything and buy little or nothing. If such a thing were possible, it would not be best for us or for those with whom we deal." How long do we conceive it possible to drain $70,000,000 annually from so few a people, and not sink them in financial ruin or compel them in self-defence and not retaliation to erect a tariff wall that will absolutely bar out our products?

Canada presents today the best opportunity in the world for reciprocity. Agriculture there reigns supreme. Her inhabitants need our manufactures, and although only 5,500,000 in number, actually bought from us last year not only as much as did the 52,000,000 people in Mexico, Central and South America, but $23,000,000 more. I advocate reciprocity with Canada; not merely a 20 per cent. preferential, but absolute free trade. We should abolish every commercial barrier, wipe out every protective tariff, and the loss to our home markets would be made up a thousandfold in the enormous growth of our Canadian commerce.

RECIPROCITY AND ANNEXATION.

But reciprocity is only a trade makeshift. The treaty of '54 was abrogated for political, not economic reasons, and a new treaty would be no more permanent than the caprices of changing governments at Washington and Ottawa. Burke claimed that England lost America because she did not take "a general, comprehensive and well proportioned view" of her dominions, and "a just sense of their true bearings and relations." Has the time not come, and is it not now imperative that we should take such a view of the "true bearings and relations" of Canada and the United States? And will it not show that what the two peoples need is reciprocity, not only of economic but of political equivalents; that trade unity with Canada will inevitably lead to political unity; that if we now give her our markets she will ultimately give us herself; in short, that annexation and not reciprocity is the only policy that will insure the permanent expansion of our Canadian commerce? That annexation, too, should be the voluntary political act of Canada, backed by the consent of Great Britain; and whenever the Dominion desires annexation, the imperial consent will be granted as willingly as was practical independence and sovereignty to Australia.

Many, however, who desire annexation think that by refusing trade concessions we can destroy Canadian commerce and compel the Dominion to accept annexation as the only escape from economic ruin. Let us take warning from our colonial history. England antagonized her colonies and alienated them. She fought her dependencies and lost them. Let us also heed our trade history with Canada. Twelve years of reciprocity had in 1866 made the Canadian provinces commercially more dependent on the United States than on each other. Had the treaty not been abrogated, the Dominion might never have been formed and the separate provinces might ere this have drifted into political union with the United States. In 1866 we lost an opportunity to annex the eastern provinces as we did in 1844 to annex British Columbia and the far Northwest. We cannot coerce Canada. She is not helpless; she is not dependent on the United States; she is a continent, of varied and unbounded resources, peopled with our own race, Anglo-Saxons, who never yet, in any quarter of the globe, have been threatened or beaten out of their inalienable right to live—economically as well as politically. We are near the parting of the ways. We can now grant trade concessions that will bind to us, commercially and politically, a generous and grateful people. or we can compel Canada to enact such tariffs as will bar out our products, engender bitter trade hostilities, and permanently segregate us as political communities.

HISTORIC REASONS FOR ANNEXATION.

And why should not the United States and Canada be one united republic? Such a union is not a sentiment born of present trade expansion. It is as old as Louisburg and the battles of Quebec and Ticonderoga. It was the colonies and not England that conquered Canada from the French. They invaded Quebec in 1690; they fought against Louisburg in 1745; in the final campaign of 1757 Pitt called for 20,000 colonial troops, and while Wolfe was to capture Quebec the colonists were to conquer the rest of Canada. They did so. All honor to Wolfe and his heroes, but full praise should be given to the armies of the colonies, which wrested from France every foot of Canada except Quebec itself. The colonists ever after considered Canadians a part of themselves; they all constituted America, said John Adams; and Canada and the colonies were "our people in America," explained Benjamin Franklin. It was a "continental" congress that made Washington commander of the "continental" army, "organized for the defence of the rights of America." The congress of 1774 addressed Quebec: "It has been with universal pleasure and a unanimous vote, resolved . . . that you should be invited to accede to our confederation." The congress of 1775 appealed to Canada: "The interests of the two countries," it said, "were really identical. The Canadians could adopt whatever form of provincial government they considered most befitting, yet still rank as an equal member of the North American union with all the other provinces." And the articles of confederation provided: "Canada, acceding to this confederation, and joining in the measures of the United States, shall be admitted into, and entitled to all the advantages of, this union." Even Article IV, Section 3, of our present constitution, providing for the annexation of new territory, was drawn with particular reference to Canada. In 1803 Governor Morris, its author, explained: "I knew then (1787) as well as I do now, that all North America must at length be annexed to us." Running through the various appeals to Canada was the argument personally urged by Franklin and Chase and Carroll at Montreal, that if Canada should join the confederation it would have "the alluring prospect of free trade"; and when the treaty of Paris was being negotiated and Lord Shelburne had finally refused to cede Canada, he assured Franklin that political separation did not mean commercial separation also, because it was "reasonable to expect," he said, "a free trade unencumbered with duties, to every part of America." The proposition, therefore, that the two people should be one is older than the republic itself; and it has always been urged on the ground that it would insure the most perfect freedom of commerce.

A GREAT NORTH AMERICAN REPUBLIC.

And what grander prize than Canada on the face of the globe today?—a continent larger than the United States with all its islands, girded about by the same great oceans, stretching through the same temperate zone, abutting fourteen of our great states for 3,500 miles, possessing 500,000 square miles of the richest farming lands known and 900,000 square miles more of arable and productive soil, covered with boundless forests and with mines of coal and iron and copper and silver and gold, all the way from Cape Breton to the Yukon—a magnificent, mighty, undeveloped and almost uninhabited domain. Our expansion on this continent has been as inexorable as the forces of nature; a slow, steady, ever-advancing annexation of contiguous territory. Already the signs are multiplying of the reviving earth-hunger in our Anglo-Saxon blood. Our arable public lands are gone; our population is increasing enormously, and its advance guards are already crossing the imaginary and invisible boundaries and spying out the rich fields to the north. Last year 25,000 Americans passed over the borders and made homes with their kindred in the Dominion. This year many more will follow, next year still more, and so on as our tide of overflowing population sets towards nature's great outlet on this continent. If today all trade barriers should be abolished, hundreds of thousands of our people and countless millions of wealth would pour into the Dominion, and for the next generation such commercial and industrial expansion would result as the world has never seen.

The people of the United States and Canada belong to the same race, come from the same motherland, dwell on the same broad continent, think the same thoughts, speak the same language, obey the same laws, and worship the same God—why should they not also live together in the same united republic? Unlike Porto Rico, Hawaii, and the Philippines, non-contiguous islands, densely crowded with alien or semi-barbarous peoples, and destined to remain permanent national territories—Canada would be taken into that inner circle of American sovereignty reserved for the lands of our own continent and the people of our own race—where every foot of her soil would sooner or later be organized into an American state. The grandest achievement of the new century will be the political union of the Anglo-Saxon peoples on this continent. What more ennobling conception can stir our civic duty and patriotic ambition? So far as in us lies let us in our day consummate the union of the United States and Canada into the freest, most enlightened, most powerful sovereignty ever organized among men.

A great hindrance to American business in Russia in the past has been the difficulty in ascertaining the financial standing of firms soliciting credit, as commercial or inquiry agencies are unknown in that country. The usual way of prosecuting such inquiries has been through special attorneys, who investigated and reported on each case separately. It is now announced that the Bradstreet Co., through its New York or Berlin agencies, is prepared to report on the financial standing of Russian business men, corporations and firms.

A chart of Ashtabula harbor in colors has just been issued by the engineer officers in charge of the lake survey and may be had from the Marine Review.

A CRUISE ON A CRUISER.

BY LAWRENCE IRWELL.

Very many people have gone to sea in the steamships that traverse the great trade routes and carry passengers in the height of luxury, but comparatively few have had the chance of taking a cruise in a man-of-war. For this reason it seems desirable to give an account of a trip made by the writer upon a fast cruiser, the type of ship that represents the frigate of old days—one of the scouts of the battle-fleet when it steams in company; one of the guardians of commerce when it is on detached duty. The British cruiser on which I was privileged to embark was employed on relief duty. She had to convey about 200 men from an English port to the Mediterranean squadron, and then to bring back a like number. The men, on the morning of our departure, have been told off to many of their duties, but much remains to be done before everything is ship-shape. The first lieutenant is moving around, notebook in hand, keeping every officer and seaman busy, and seeing that each knows his place and his work under all circumstances. The navigating lieutenant is on the fore-bridge with the captain who is, of course, responsible for the navigation, as for everything else; but the navigating lieutenant lays down our track upon the chart, and can at any moment show the exact position of the ship. Our navigator, as a specialist, is very enthusiastic about his work, and it is very seldom that he is not busily employed. By day and night he is always on the alert, and one would suppose that he managed to live without sleep. Every point that he sights, every light that sheds its beam across the water enables him to take his bearings. He has his dead reckoning from the log; and even if there is a fog, he can still make a shrewd guess as to the ship's position; but he does not like to be reduced to this, for many unforseen influences may be at work, any one of which may produce grave error.

The first lieutenant is the mainspring of the whole ship. He is supposed never to have a minute to himself at sea, and to have his work doubled when the ship is in port. On a cruiser which does not carry a commander he is the senior executive officer. Everything passes through his hands, and his voice is heard throughout the day carrying on the ship's routine. Instruction, reproof, and very occasionally approbation flow from his lips without pause. It must be added that the freedom of expression which used to be common in the British naval service has of late years been very much modified. The breach of every gun is shrouded with a water-proof cover, and the threatening muzzles are turned parallel with the ship's sides ("inboard.") Rifles are hung in racks in sheltered places, and the torpedo tubes hide themselves in the shade. About the most interesting to the onlooker of the many drills that occupy the day is the falling-in of the ship's company at "general quarters." As we have a scratch crew, the members of which have only just come together, and many of whom may not have previously served on a cruiser, the first lieutenant commences by assembling them and repeating to them in detail what has to be done by each of the parties already told off. They are finally dismissed, and a few minutes later the bugle sounds. Then a scene of orderly bustle follows. The officers buckle on their swords; the seamen and marines run to the arm-racks, fetch rifles and sling them behind the guns in readiness for a possible hand-to-hand combat. Every man has provided himself with an ammunition pouch, and the crews fall in by their own pieces. The guns are swung round and pointed over the sides. The "hoists" for shell communicating with the magazines are opened, and in four minutes from the sound of the bugle, the ship is ready to speak in tones of thunder to an enemy. Very fair work; but, of course, in a ship that has been long in commission everything, from constant repetition, goes like clockwork, and the slight delays which are now unavoidable never occur. When a ship is really cleared for action, which is done frequently during a commission, not only are the guns prepared, but the railings round the poop and forecastle fall flat, every possible object of hamper is removed, and nothing is left that could be at all in the way of the freest movement. I have said that, with a new crew, everything was ready for action in about four minutes; but on a well-drilled ship a heavy gun could be fired in less than two minutes from the last note of the bugle's warning, and in time of war everything would be in such a state of readiness (a certain amount of ammunition on deck, etc.), that the order to come into action and the firing of the first shot would be almost simultaneous.

Looking at the armament, I find there are two 6-in. guns, one on the poop and one on the forecastle, each of which throws a 100 lb. projectile. These great pieces are mounted on elaborate machinery, and can be traversed, sighted, and fired as easily as a rifle. Then there are six guns, each of which throws a 45 lb. projectile. These, like the two 6-in. guns, have their crews protected by shields, and are equally accurate and manageable. In addition, there are eight 6-pounders, four Nordenfelts, and four torpedo tubes. Heavy as the fire of such an armament would be, there is undoubtedly some difference of opinion among naval officers as to whether cruisers armed as described are sufficiently armed in comparison with those of certain European nations. The theory on which the British authorities work is that coal-carrying capacity with a large supply of ammunition (involving a comparatively light armament) is preferable to heavier guns with less room for coal and a smaller ammunition supply.

It may be admitted that a French cruiser of equal nominal size might, at broadside to broadside, overpower an English one, but before the ships could thus meet, there is much that must occur. Lighter, faster, able to remain at sea for a longer period, it may well be supposed that the British cruisers would more than hold their own against the heavier armed ships of a foreign power, even as Howard's light craft were able to tackle successfully the floating castles of the Armada 600 years ago. Superior seamanship and gunnery—on whichever side it might be—would also have much influence in striking a balance.

Clearing away all deck hamper for action has been mentioned, and the question naturally arises, what is to become of the ship's boats which hang on davits fore and aft? In case of serious action every boat would become a source of grave danger. If an enemy's shot struck any one of them (and they are in such exposed positions that they must inevitably be struck) the splinters of wood and iron would carry death and destruction to the gun's crews and others on deck. The scattering fragments, too, would be almost worse than the bursting shell. It could not be hoped that, after an engagement of half an hour, there would be any single boat left that could float, and in the meantime their presence would have added heavily to the already inevitable loss of life in action. So completely has this been recognized that many naval officers of experience have it in their minds that, if they were called to engage in action, they would drop them over the ship's side and let them drift. When the action was over a victorious ship could then cruise round the place where the battle had been fought and take the chance (a reasonably good one) of picking up at least some of her boats.

Our ship's complement of men, when fully manned, is something short of 300, including marines and engine room staff. Certainly a more workmanlike lot it would not be easy to find than the men whom we now have on board. They are not giants, and in actual physical size they are less in stature than the men of some other navies. But, as has already been explained, British bluejackets are "caught" young, and have two or three years training as boys before they are rated as men and commence their regular 12 years' service. In handiness, general knowledge, discipline, and activity they leave little to be desired. The difficulty which is presented by the modern construction of ships of war is that of giving to the crews sufficient physical work to keep them in first-class condition. Some of the men are actually fat and a number carry more flesh than is desirable. On the big battleships there is space enough to have arrangements and appliances for gymnastic exercises, but on smaller vessels this is impossible. While in port the men are often landed, and this, besides making them peculiarly efficient for service in the naval brigades is of considerable value in keeping them healthy and replacing the work which was, in the old days, provided by the handling of sails and ropes and the constant duties aloft.

Marvelous to an onlooker is the adaptability with which all the men, by virtue of their previous careful training, fall into their places in a new ship. Equally surprising is their familiarity with the elaborate machinery of modern days, and the smartness with which they handle the tremendous armament committed to their care. If the best authorities, the captains who command them, may be credited, their general good conduct and sense of duty are equally remarkable. The offenses which they commit are few and unimportant, a condition which is believed to be due to the strict yet considerate manner in which authority is exercised by the officers. As an example of the difference between the conditions of the British navy—or the American—and the navies of other nations, the following incident may be related. It is true, of course, that the assertions cannot be absolutely vouched for. A couple of years since it was credibly reported that when two Russian battleships were in the vicinity of Malta, three men were hanged for breaches of discipline. What would be said—and what would the public do—if such an occurrence happened on the ships of Uncle Sam or John Bull?

As the captain's guest I was at liberty to make use of his quarters during the day, and I occupied a spare officer's cabin at night. Every officer above the rank of sub-lieutenant has little discomfort in his accommodation at sea. The ordinary cabins are certainly not large, but every inch of space is utilized, and the ordinary requirements of any reasonable man are fairly met. There are plenty of roomy lockers in which to stow away the most voluminous wardrobe. There is a bath-tub, and plenty of hot water is procurable. The bed has the most comfortable of spring mattresses, and is long enough for any ordinary individual. The quarters where the captain dwells in solitary state are as extensive as an ordinary bachelor's rooms ashore. He has an after cabin as a parlor, a fore cabin as a dining room and a sleeping cabin, and these rooms may be, and generally are, well furnished. A writing table, a mirror, armchairs, a couch are all provided by the government; and the quarters only require the bookcases, pictures, etc., which their occupant adds according to his taste, to be fit for even the reception of an admiral. There are objects present, however, which show that the cabin is not a part of a steam yacht. It is, of course, a deck cabin. Two 6-pounder guns have their places, and in action the captain's quarters are not an unimportant part of the ship's fighting strength.

The officers of the ship take their meals ("mess") together in the wardroom, and on a bigger ship which carries midshipmen, all the junior officers mess in the gunroom. It has often been suggested that all officers, including the captain, should mess together, as is the custom in the armies of many countries; and it is usually believed that the practice would have many advantages. As it is, although British naval captains make a point of asking some of their officers to dinner quite frequently, the captain of a ship leads, in time of peace, a life "both dull and dignified."

We have been steaming at the rate of about 15 knots an hour, and on the evening of our first day out from England we are off Ushant (an island off the west coast of France). We enter the Bay of Biscay still carrying fine weather with us as we plough our way towards Finisterre, and in a little over 24 hours more we find ourselves passing down the shores of Portugal. It is a Sunday morning, and, in accordance with the time-honored custom of the navy, the ship's company assembles for divine service, which is read by the captain, as the ship does not carry a chaplain. It is not on Sundays only that a religious service is held. Daily prayers are read by the captain, and never may a more devout congregation be seen than the crowd of fighting men who follow his words.

On the fourth day after leaving England we are at Gibraltar, and having filled up our coal bunkers, another day sees us speeding along towards the island of Malta with the white tops of the Sierra Nevada mountains of southern Spain on our beam. We see little beyond the outline of the hills, for our skipper does not like to be near the shore. At last the island of Gorzo, four miles from Malta, rises from the waters, and the light of evening falls on the white houses and gigantic forts of Valetta, the Maltese capital. Our bow is now turned to the narrow entrance of the man-of-war harbor. As we steam slowly past the port of St. Elmo, the massive forms of many battleships, as well as cruisers and torpedo boats, come in view. They all look spick and span—as clean as they can possibly be made—very different from our own boat which is only on a short commission, and whose officers have not had time or opportunity to give the finishing touches that accentuate the beauty of graceful lines and elaborate equipment. Everybody who has seen a man-

of-war in commission knows what a splendid appearance she presents and how thoroughly every inch of her is cared for. The great black sides are smooth and polished as if enamelled; the ordnance is burnished like silver; the gilding of the stern is gorgeous; every piece of metal shines like an ornament in a jewel case; the boats are thoroughly painted and varnished, and every article of equipment is stowed in rigid order. All these things mark the most careful supervision of details, the most perfect discipline and organization. But John Bull is stingy, and the taxpayer pays for little of the extreme polish and decoration in a warship's appearance. When she is handed over to her officers and crew there is nothing provided for beauty beyond the most simple painting and ornament. Everything in excess of this is provided out of the private pocket of the senior executive officer (the commander of a battleship or the first lieutenant of a cruiser), to whom his ship is as a wife or a child, to be turned out radiant and spotless at all times; and this is not a trifling expense. Even in a cruiser it amounts to almost $300 a year, and in the case of a larger ship a far greater sum is, of course, necessary. Sometimes the captain shares the expense, but not always. However, whatever of smartness the ship's appearance may have, the senior executive officer reaps his reward in the credit that he receives, and this may possibly recommend him for advancement to the admiralty department.

Constant signalling has been going on between us and the flagship, and orders have been received for us to moor to buoys in a particular spot. As we take up our position, the ship is surrounded by a crowd of shore-boats, and the special "bumboatman" who is to have our trade makes his appearance on board. (A "bumboat" is a specially wide boat used for the purpose of bringing from the shore fruit, vegetables, and such luxuries as the ship's company may wish to buy). This boatman takes away laundry and brings it back, in addition to executing all sorts of commissions. Our "bumboatman" is an elderly Smytch (as an inhabitant of Malta is called by the English), and, as he can neither read nor write, he must carry all orders in his head. I was informed that Sir Thomas Lipton was anxious to get all the "bumboat" work at Malta, and that he offered, if the British government would give him the monopoly, to run a special steamer to the squadron at the Levant (the eastern part of the Mediterranean) once a month, to take out all supplies and bring back invalids to the naval hospital at Malta. This was, however, more than could be conceded by the British government, and the trade is still in the hands of local men, who have in times past left little to be desired, and, as they are stimulated by active competition, they may be expected to meet all requirements for the present.

We have little time for more than a taste of the flood of pleasure-making and hospitality for which Malta is so famous. The men who have been brought out are distributed to their new ships. Time-expired men have come on board in their places, the coal-bunkers are again filled, and, as time is of importance, we are ordered to sea.

The winds to be dreaded in the neighborhood of Malta are the Gregales—those that blow from the northeast. Many people believe that gales are almost unknown in the Mediterranean, and that it is always a sunny, smiling sea. Let them expunge such an idea from their minds; the weather can be as bad there as in any other sea. As soon as we have cleared the harbor we find that we are in the sweep of a rapidly freshening gale, and for the next 48 hours we are certainly very far from being at our ease. Our cruiser is a first-class sea boat, but she is a very wet one, and her decks are constantly awash. She rolls, pitches and staggers under the mighty thrashing of the waves. Everything that is not securely and firmly lashed on the decks or in the cabin breaks loose and charges erratically from side to side.

But even a gale must come to an end at last, and once more we are able to lay on our course and increase our speed to 14 or 15 knots. We call at Gibraltar, where we find an Italian and an American man-of-war. The courtesies of navies are interchanged; an officer arrives from each ship in the fullest of full-dress to pay a ceremonious visit, and one of our officers has in turn to put on his cocked-hat and epaulets and return the compliment.

CLASSIFICATION BOOK FOR ST. LOUIS EXPOSITION.

An advance copy of the classification book for the Louisiana purchase exposition at St. Louis in 1903 has been received. Fifty-three pages are required for a mere enumeration of the groups and classes of exhibits. The exhibits of the entire exposition are divided into fifteen departments as follows: Education, eight groups; art, six groups; liberal arts, thirteen groups; manufactures, thirty-four groups; transportation, six groups; agriculture, twenty-seven groups; horticulture, seven groups; forestry, three groups; mining and metallurgy, five groups; fish and game, five groups; anthropology, four groups; social economy, thirteen groups; physical culture, three groups. The total shows 144 groups and 807 classes, and under each class is a possibility for a multitude of exhibits. Nothing reflects more clearly in so small a space the variety of human occupations or more comprehensively the broad scope of the great exposition which the people of St. Louis are preparing for next year. A place is provided for every conceivable product worthy of exhibition and all nations of the world have been invited to take part. Acceptances have been received from many. The work of construction is progressing earnestly. The buildings will have an aggregate floor space of 200 acres and the grounds a total area of 1,000 acres. The money now available aggregates $15,000,000, besides $1,000,000 appropriated by the state of Missouri and various liberal sums from other states. The classification and the rules and regulations of the exposition will be mailed free on application to the director of exhibits, world's fair, St. Louis.

The Holland submarine torpedo boat Plunger was launched last week at the Lewis Nixon's Crescent Ship Yard, Elizabethport, N. J. The Plunger is a sister ship of the Adder, Moccasin, Porpoise, Shark and Fulton and of the Grampus and Pike, now building at the Union Iron Works, San Francisco. The boat will have a surface speed of 8 knots with a radius of action of about 500 miles. The under-water speed will be 7 knots with a radius of 40 miles. The crew will number seven men. She will be fitted with one torpedo tube and will carry three of the new long Whitehead torpedoes instead of the old 11 ft. 9 in. style carried by other vessels of this type.

REPUBLIC IRON & STEEL CO.'S REPORT.

Net profits of the Republic Iron & Steel Co. for the six months ended Dec. 31, 1901, were $933,123, or 4.58 per cent. on the outstanding preferred stock. This is at the rate of 9.16 per cent. for the year. The net profits for the year ended June 30 were only $309,098. For the six months ended Dec. 31 the company had a surplus of $221,506 after the payment of two quarterly dividends amounting to 3½ per cent. on the preferred. Added to the previous surplus this amount gives a total of $1,331,172 which the company had Dec. 31, 1901. The following shows the financial operations of the company for the six months to Dec. 31:

Profits after deducting expenses, excepting repairs and renewals		$1,419,549.88
Less operating, improvements, renewals and repairs (as against $566,622.54 during the previous twelve months).		486,426.42
Net profits during the six months		$ 933,123.46
Deduct, two quarterly dividends of 1¾ per cent. each on the preferred stock outstanding, paid Oct. 1, 1901, and Jan. 2, 1902		711,616.50
Surplus		$ 221,506.96
Surplus June 30, 1901		1,109,665.68
Surplus on books Dec. 31, 1901		$1,331,172.64
The balance sheet as of Dec. 31 is as follows:		
Real estate, plants, buildings, machinery and other permanent investments		$41,091,018.54
New construction:		
May 1, 1899, to June 30, 1900	$1,218,203.44	
July 1, 1900, to June 30, 1901	1,164,175.26	
July 1 to Dec. 31, 1901	1,236,231.49	
		3,618,610.19
Stocks in sundry companies at cost		147,200.00
New gas pipe lines and gas leases, reconstruction, prepaid royalties on ore, coal, etc., in excess of amounts charged to operating		216,154.70
Inventories of raw and finished materials at cost		3,327,605.71
Accounts and and bills rec		3,015,041.92
Cash on hand		948,813.58
Total		$52,364,444.64
LIABILITIES.		
Capital stock issued:		
Preferred	$20,852,000.00	
Less in treasury	495,100.00	
Total	20,356,900.00	
Common	$27,352,000.00	
Less in treasury	161,000.00	
Total	$27,191,000.00	$47,547,900.00
Accounts and bills payable		2,829,801.31
Preferred dividend No. 10 (paid Jan. 2, 1902)		356,245.75
Deferred installments on purchase of coal lands, payable in four annual amounts of $37,000 each		148,000.00
Reserve for taxes and insurance		81,991.15
Reserve for possible losses in collection of oustanding accounts and bills received and to cover unknown contingencies		69,333.79
Profit and loss account:		
Net profit six months	$ 933,123.46	
Deduct two quarterly dividends on preferred.	711,616.50	
Surplus during six months	$ 221,506.96	
Add surplus June 30, 1901	1,109,665.68	1,331,172.64
Total		$52,364,444.64

The company reports a rich supply of raw materials in the ground estimated to be worth more than the outstanding preferred stock and enough to last for many years. It is itemized as follows:

14,000,000 tons Lake Superior ore, 50c ton	$ 7,000,000
6,000,000 tons Connellsville coking coal, 25c per ton	1,500,000
12,500,000 tons Pittsburg steam coal, 10c per ton	1,250,000
50,000,000 tons Alabama coking coal, 50,000,000 tons Alabama red ore, 20,000,000 tons Alabama brown ore, 10c ton	12,000,000
Total	$21,750,000

From the date of organization, May 11, 1899, to Dec. 31, 1901, the company has charged to operating and written off against profit and loss, for amounts expended in reconstruction, improvements, renewals and repairs the sum of $1,946,062.85, as follows:

From May 1, 1899, to June 30, 1900	$ 893,013.89
From July 1, 1900, to June 30, 1901	566,622.54
From July 1, 1901, to Dec. 31, 1901	486,426.42
Total	$1,946,062.85

This money has been expended almost wholly on plants that are best located in reference to markets for raw material, and where steady sales are best insured by local conditions. The expenditure has improved the physical condition of the plants now in operation, has materially increased the future earning capacity and placed the company in a strong position to produce a largely increased output at much saving in cost. In addition the balance sheet shows that since May 1, 1899, the company has invested $3,618,610.19 in entirely new construction.

For navigation charts apply to the Marine Review.

SOME OUT-OF-THE WAY MARKETS FOR IRON AND STEEL.

"It is a singular feature of the iron trade of the world that the best markets, with rare exceptions, are those of the countries that are themselves largely engaged in producing the very best things that they want to purchase, and do purchase, on a large scale," declares the London Iron and Coal Trades Review. Continuing, the Review notes that "until lately no market was so good as that of the United States, and, despite the high-tariff policy of the country, it still imports iron and steel to the value of over $12,000,000 a year. But the most singular feature of this manifestation is that the United Kingdom, which is the greatest exporter of iron and steel in nearly every form, is itself a larger importer of these metals than any other country in the world, and Great Britain is followed at a not very great distance by Germany, which is almost as large a producer of pig iron and an even larger producer of steel. France is a considerable way behind Germany, and Belgium is a long way behind France, as an importer of iron and steel goods, which again bears an approximate relation to the extent of the output of these several countries.

"The demands of the iron-making countries have, however, got into certain defined and understood grooves, and each source of supply is more or less similarly fixed. It is different with some out-of-the way markets that are now being contested by the leading iron-making countries. Probably the most promising of these are in China, India and South Africa, when the conditions which make for rapid progress have been more matured. In the meantime, it is natural that attention should be given to minor markets, and not least so in these days of stress and strain, when commercial crises and industrial depression appear to be either actual or anticipated in most of the countries of Europe. Among such minor markets, outside of British colonies, the republics of South and Central America are entitled to a prominent place. Here the most recent records are generally quite reassuring. Since 1897 the total imports of the Argentine have risen from 98,250,000 to 113,500,000 pesos, and those of Mexico from 42,250,000 to 61,250,000 pesos. Brazil has reduced her imports from £26,500,000 to £22,500,000 between 1895 and 1899, but that is not so disquieting a fact as to cause serious apprehension as to the future. Nicaragua has progressed in imports from $2,500,000 to $3,000,000 between 1897 and 1900, and Peru between 1891 and 1899 has gone from 15,250,000 to 18,500,000 sols. Uruguay, again, has risen from 19,500,000 pesos in 1897 to 24,000,000 pesos in 1900, while Colombia within the same period rose from 80,000,000 pesos to 88,500,000 pesos. Nevertheless, the progress is not so fast as commercial nations would like, and it causes great searchings of heart on the part of commercial men to determine how far much of the trade of these countries is worth having. Are they likely to be better markets in the future than they have been in the past? Are their methods likely to conform more acceptably to European models? Is their credit to be trusted? These are a few of the problems that are liable to give pause to the manufacturer who is so enterprising as to seek for new markets in out-of-the-way countries. So far as Great Britain is concerned, she has no need to reproach the majority of the South American republics. With one or two exceptions, they have in the past given her the great bulk of their import trade. The Argentine took from us in 1900 imports valued at 38,500,000 pesos, against 13,500,000 pesos from the United States and 16,500,000 pesos from Germany. Brazil gave us £6,500,000 of her import trade in 1899, against £3,250,000 to Germany and £3,750,000 to the United States. Nicaragua treated us almost equally well in 1890 by giving us nearly one-half of her total foreign import trade. Chili, again, in the same year took from us more than one-half of her total imports, three times as much as she took from the United States and two and one-half times as much as she took from Germany. In Peru in 1899 we captured one-half of the total imports, or more than twice as much as the United States. In Colombia we did a larger business than Germany, and rather more than half that of the United States, while in Mexico and Costa Rica the United States almost naturally lead. Generally speaking, the principal South American countries importing iron and steel are: The Argentine, Mexico, Paraguay, Chili, Uruguay and Colombia. But there are, of course, a number of other markets, including Peru and Brazil, which should assume increasing importance in the future, and which our iron merchants and manufacturers will be sure to find it worth while to cultivate if they apply themselves to that task with energy and judgment.

"Among markets that are less out of the way, some in the east of Europe are deserving of consideration, and not least so those of Turkey, Palestine and Greece. All of these are small markets, and it hardly looks as if they were ever to become much larger, but their antiquity compares curiously with the records of some of the newer countries. Turkey, of course, has been making little or no commercial progress for many years. Her total imports, which in 1900 were 212,000,000 piastres, have not advanced in any material degree since the year 1870. Her stage of attainment in the mechanic arts is indicated by the fact that in 1897 she imported a value in machinery of only 5,744,000 piastres, or about £45,000. Great Britain continues to retain the largest hold on the markets of Turkey, and, despite the keen competition of Germany and France, sends her more than twice the value in imports of either of these countries. It is otherwise with Palestine, in which France has a greater hold than any other country, having secured 18.6 per cent. of the total trade in 1900, against 9 per cent. taken by Germany and 13.9 taken by England. Greece, again, is one of the few countries that made no progress in her foreign trade in 1900, her imports of metals and metal wares in that year having been only 5,644,000 drachmen, against 6,241,000 in 1899 and 6,327,000 in 1898."

SHIP CONSTRUCTION DURING JANUARY.

The bureau of navigation reports that seventy-four vessels of 22,796 gross tons were built in the United States and officially numbered during 1902 as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and gulf	29	6,014	18	1,062	1	1,651	5	6,698	53	15,425
Porto Rico										
Pacific	7	3,821	6	1,164	---	-------	1	2,036	14	7,021
Hawaii										
Great lakes	1	12	1	30	---	-------			2	42
Western rivers	---	-------	4	166	---	-------	1	142	5	308
Total	37	9,847	29	2,422	1	1,651	7	8,876	74	22,796

The largest steel steam vessels included in these figures are the El Alba of 4,614 gross tons built by the Newport News Ship Building & Dry Dock Co., Newport News, Va., for the Morgan line, and the Spokane, built by the Union Iron Works, San Francisco, for the Pacific Coast Steamship Co.

THE FUTURE COAL SUPPLY.

According to the London Iron & Coal Trades Review, the total output of coal in the world in 1883 was only about 385,000,000 tons, but in 1900 it had increased to about 760,000,000 tons, so that there was an increase in this interval of 375,000,000 tons, or about 82 per cent. If in the next forty years this rate of increase is maintained the world's coal consumption in 1940 should be something like 1,400,000,000 tons, or nearly double the present colossal figures. Should this result actually come about, where are the new coal supplies to be obtained? The London Coal & Iron Trade Review asks:

"How far can the United Kingdom go in the direction of providing for the increase of demand? Is it not almost inevitable that Great Britain must be content in the future to play a more subordinate part in the great business of supplying the world with coal? Is it not more than probable that the United States, Russia, China, Canada and the Australasian colonies must inevitably come much more prominently to the front as sources of supply? Is it not even probable that when Great Britain has tapped all the available sources of supply there will be a danger of periodical famine conditions, induced by such potent influences as those which, during the last three years, have led to an increased output of nearly 110,000,000 tons a year by three countries alone—Germany, Great Britain and the United States?"

What promises to be the greatest assemblage of warships, British and foreign ever seen at Spithead, will be gathered together for the forthcoming naval review to be held in connection with the coronation festivities. The arrangements are now being made by Admiral Sir Charles Hotham, commander-in-chief at Portsmouth, and June 28 is at present arranged the day on which the review will most likely take place. A feature of special interest in connection with this review is the fact that H. R. H. the prince of Wales, will, for the first time, hoist his flag on the London as an admiral of the United Kingdom. On this occasion his royal highness will be in command of the fleet which is to be reviewed by the king. The London is of a class of three ships and was launched in September, 1899. She is of 15,000 tons displacement and designed for a speed of 18 knots. Her crew musters all told 789 men.

For navigation charts apply to the Marine Review.

STEAM BOILER EQUIPMENT CO.

The Steam Boiler Equipment Co., of No. 20 West Houston street, New York, has taken up with ship owners in different parts of the country negotiations for the use of their system with a view to economy of operation, especially on yachts and harbor boats. They present various tests showing great reductions in fuel consumption. One case is that of the steam yacht Niagara, which was originally using three boilers (nine furnaces and consuming 24 to 26 tons of fuel in 24 hours, as against a consumption now of 16 to 18 tons in the same period with two boilers (six furnaces). The coal and speed trials of this vessel (two boilers—six furnaces) are thus reported:

Date, 1901.	From	To	Miles.	Time. Hrs.	Time. Min.	Coal, tons.	Coal, average 24 hrs.	Speed, miles per hr.
July 24,	Waterford	Queenstown	62	5	44	3.80	16.38	11.50
July 26,	Queenstown	Bantry Bay	99	10	19	6.30	15.03	9.70
Aug. 5,	Queenstown	Tor Quay, Eng.	250	23	00	17.00	17.00	10.90
Aug. 6,	Tor Quay	Cowes	88	8	13	6.30	18.01	10.90
Aug. 9,	Cowes	Havre, France	100	9	52	6.10	14.07	10.70
Aug. 10,	Havre	Cowes	108	10	03	6.50	14.80	10.40

OCEAN LINES COMBINE ON FREIGHT RATES.

Practically all the steamship lines running between this country and England have signed an agreement to sustain certain minimum eastbound freight rates in grain, flour and provisions which have already become operative. These minimum rates are 1½ pence a bushel for grain, 7 shillings 6 pence a ton for flour and 10 shillings a long ton of 2,240 lbs. of provisions. No freight already landed will be affected by the agreement. The lines signing it, according to L. Bowne Sanderson, of the Wilson line, are the White Star, the Cunard, the American, the Red Star, the Leyland, the Atlantic Transport, the National, the Wilson, the Furness-Leyland, the Lamport & Holt, the Philadelphia-Manchester, the Chesapeake and Ohio Steamship Co., the Virginia line and the Dominion line. The ports touched by these lines are Montreal, Portland, Boston, New York, Philadelphia, Baltimore, Newport News, Norfolk, and New Orleans on this side, and Liverpool, Manchester, Southampton, London and Hull, in England. While Mr. Sanderson did not mention the Elder-Dempster, the Bristol City, which runs from this port to Swansea, and the two Glasgow lines, the Anchor and the Allan State, it is probable that these lines have signed the agreement, as such an agreement would lack adhesiveness without them. Mr. Sanderson said the only exception was the Philadelphia Transatlantic line, operating between Philadelphia and London.

The object of the combination is to maintain a freight rate that will insure a margin of profit. For many months, owing to the small amount of grain crossing toward Europe, freight rates have been very low. Grain being the cheapest cargo to handle, is usually the one on which freight rates are based. When the demand for space for grain is great, then rates go up on every class of freight. When there is little moving, then the rates go down. The three items on which the combination will make an effort to maintain a minimum rate are the important food supplies which Americans furnish Europe in large quantities. The prevailing rate for them has been: Grain, 1 penny a bushel; flour, 6 shillings and 3 pence a ton, and provisions, 7 shillings and 6 pence. The rates of increase are therefore 50 per cent. on grain, about 20 per cent. on flour, and 33⅓ per cent. on provisions. This rate is said to be higher than it has been before in a year. The steamship men say that only on this rate can they make it pay to operate their steamers. It is more difficult to maintain an ocean rate than a railroad rate, as tramp steamers have as much right to enter a port for a cargo as a regular line steamship has, and if they desire to do so for the sake of a cargo, they can cut under the price. For this reason the experiment which the steamship lines are making will be of more than ordinary interest.

The immense tonnage which is controlled by the lines in the combination may be imagined when it is stated that the tonnage of the Leyland line, which would be engaged in this service, is 171,800; the American line, 44,871; the Red Star, more than 100,000; the White Star, 132,875; the Atlantic Transport line, 158,741, and the Cunard line, 120,000.

Apparently the freight agreement is the basis of all the cable dispatches which were received here regarding the amalgamation of the White Star with a number of other lines.

A number of very complete outfits of driving machinery and boat equipment, accompanied by plans and specifications for building the hull and installing the machinery, have been sent out by the Marine Iron Works, station A, Chicago. Several similar contracts now under way. This is a plan that they have demonstrated to be an exceptionally good one, particularly for those located at a distance where they may have suitable material and good men to do the work, provided they secured the necessary information with plans and details, all of which the Marine Iron Works furnish with their complete machinery outfits when so contracted for. 3

TRADE NOTES.

Horace J. Conley, yacht and boat builder of Green Bay. Wis., writing to the Review, says that the floor space of his new building will measure 5,800 sq. ft. and that his entire floor space is 12,000 sq. ft.

The Cataract Power & Conduit Co. of Niagara Falls has recently awarded to the Westinghouse Electric & Mfg. Co. a contract for seven 2,500 H.P., oil-insulated, water-cooled transformers. These transformers will be wound for 2,200 volts, 2-phase, to 11,000 or 22,000 volts, 3 phase, and will duplicate the present equipment in the transformer house at Niagara Falls.

The Union Railroad bridge which crosses the Monongahela river at Pittsburgh has been painted with Dixon's silica-graphite paint, manufactured by the Joseph Dixon Crucible Co., Jersey City, N. J. This notable structure is subjected to heat from the molten metal of the Carrie furnaces, sulphur fumes from locomotives and river steamers and also from the adjoining furnaces and steel mills.

A. Wells, Case & Son of Highland Park, Conn., have just issued another catalogue dealing with the Case outward thrust propeller wheel. The sale of this type of wheel has increased on an enormous scale. especially for fast passenger craft and steam yachts. The catalogue is well illustrated and all that is said of the merits and peculiarities of the wheel is in very plain language—free from the technical terms and geometrical problems.

U. S. Engineer Office, 1637 Indiana Ave., Chicago, Ill., January 27, 1902. Sealed proposals for dredging at Calumet Harbor, Ill., will be received here until 12, noon, March 5, 1902, and then publicly opened. Information on application. O. H. Ernst, Lt. Col., Engrs. Feb. 27.

U. S. Engineer Office, Buffalo, N. Y., February 1, 1902. Sealed proposals for removal of wreck in harbor at Buffalo, N. Y., will be received here until 11 A. M., March 4, 1902, and then opened. Information furnished on application. T. W. Symons, Major, Engrs. Feb. 27.

Sealed proposals will be received at the office of the Light-House Engineer, Buffalo, N. Y., until 12 o'clock noon (standard time) of Friday the 28th day of February, 1902, and then opened, for constructing two beacons, one lantern and a fog-signal house, including foundations and protection work, in main south entrance of the new breakwater at Buffalo, N. Y., and one beacon on the south end of the New North Breakwater, main entrance to Buffalo Harbor, New York. Blank forms of proposal with specifications and plans, may be had on application to Major T. W. Symons, U. S. Engineer, Tenth Light-House District. Feb. 13.